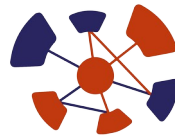




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AI in research software

Part X: Research Data Management



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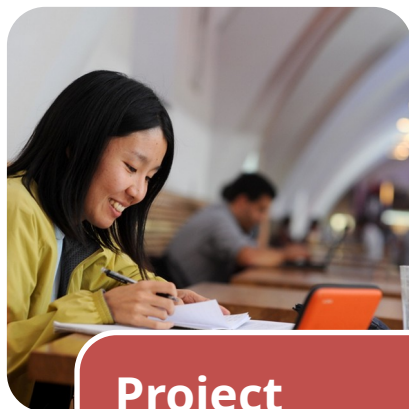
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Research Data Unit at Heidelberg University



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<http://data.uni-heidelberg.de/>



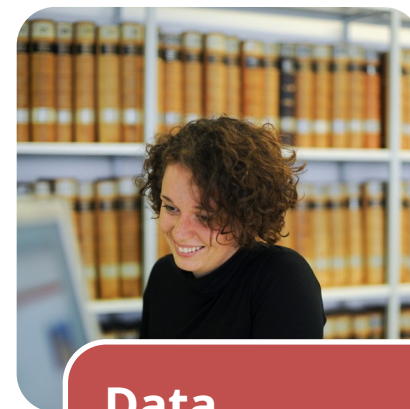
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Newsletter Research Data Unit (RDU)

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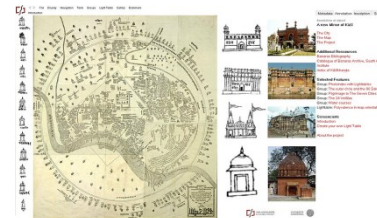
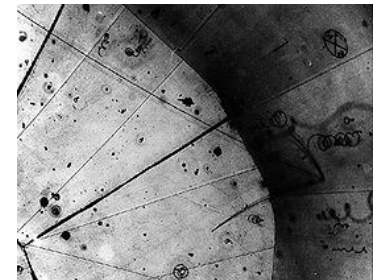
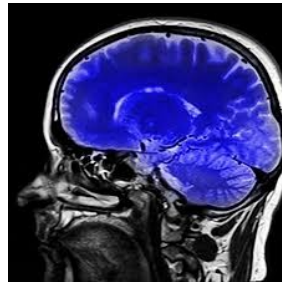
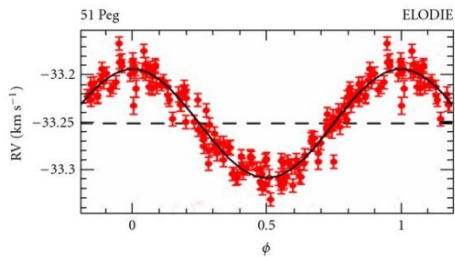
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WHAT IS RDM ABOUT?



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Data Driven Research



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Neelie Kroes

Member of the European Commission responsible for the
Digital Agenda

the new gold

Check Against Delivery
Seul le texte prononcé fait foi
Es gilt das gesprochene Wort

Opening Remarks, Press Conference on Open Data Strategy

Brussels, 12th December 2011

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Regulating the internet giants

The world's most valuable
resource is no longer

The data economy demands a new approach



Simon C. Lin
Eric Yem Editors

Data Driven e-Science

Use Cases and Successful Applications
of Distributed Computing
Infrastructures (ISGC 2010)

Springer



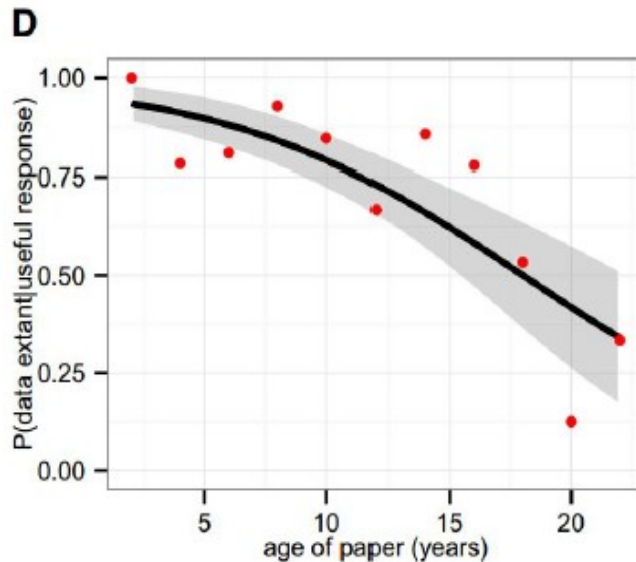
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Data Driven Research?



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“The underlying data researchers analyze to come to their published conclusions ... **becomes less and less accessible to researchers over the years.**” (Vines et al, 2014; Dehnhard, Weichselgartner & Krampen, 2013; Wicherts et al, 2006)



(D) Predicted probability that the data were extant (either “shared” or “exist but unwilling to share”) given that we received a useful response.

Slide: [Dehnhard 2014](#)



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Data Driven Research?



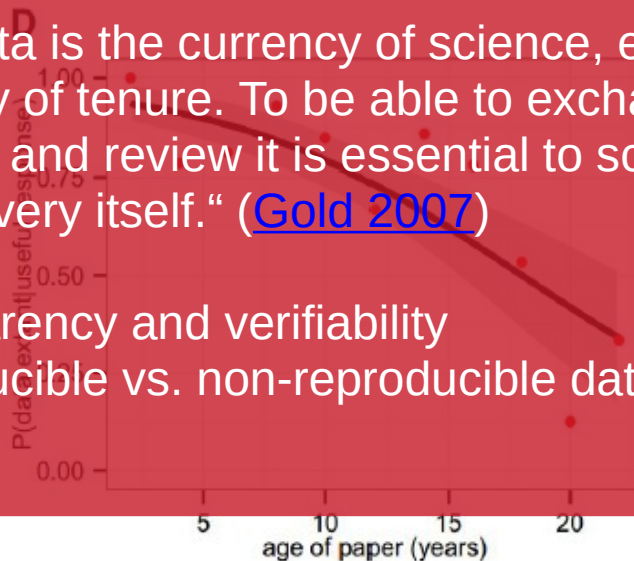
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“The underlying data researchers analyze to come to their published conclusions ... becomes less and less accessible to

researchers over the years.” (Vines et al, 2014; Dehnhard, Weichselgartner & Krampen, 2013; Wicherts et al, 2006)

Why is that disastrous?

- „[...] data is the currency of science, even if publications are still the currency of tenure. To be able to exchange data, communicate it, mine it, reuse it, and review it is essential to scientific productivity, collaboration, and to discovery itself.“ ([Gold 2007](#))
- Transparency and verifiability
- Reproducible vs. non-reproducible data
- Re-use



(D) requested data were extant (either “shared” or “exist but unwilling to share”) given that we received a useful response.



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Slide: [Dehnhard 2014](#)

What is research data management?



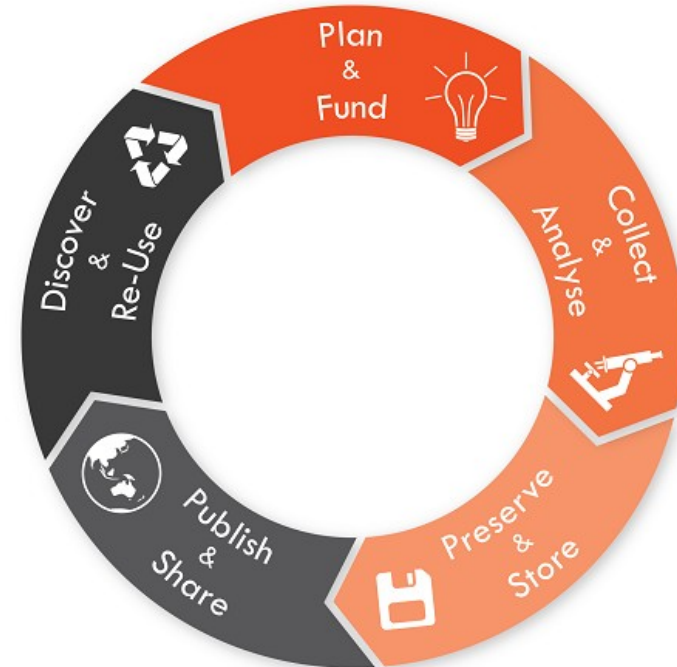
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Research data management

"Research data management concerns the organisation of data, from its entry to the research cycle through to the dissemination and archiving of valuable results. It aims to ensure reliable verification of results, and permits new and innovative research built on existing information."

(Whyte, A., Tedds, J. (2011).

[‘Making the Case for Research Data Management’](#). DCC Briefing Papers. Edinburgh: Digital Curation Centre.)



<https://library.sydney.edu.au/research/data-management/research-data-management.html>



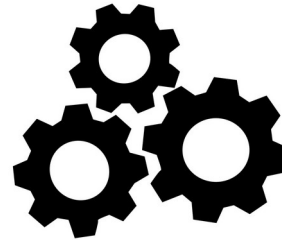
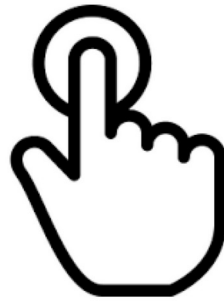
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FAIR Data Principles



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F_{indable} A_{ccessible} I_{nteroperable} R_{eusable}



- [FAIR Data Principles](#)
- Wilkinson et al. (2016), The FAIR Guiding Principles for scientific data management and stewardship, Scientific Data 3, [doi:10.1038/sdata.2016.18](https://doi.org/10.1038/sdata.2016.18)
- SNF: [Explanation of the FAIR Data Principles](#)



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FAIR Data Principles



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F indable A ccessible I nteroperable R eusable

F = findable

Others can discover your data.

- described via rich metadata,
- persistent identifiers (e.g. DOI),
- indexed in catalogues or databases

- [FAIR Data Principles](#)
- Wilkinson et al. (2016), The FAIR Guiding Principles for scientific data management and stewardship, Scientific Data 3, [doi:10.1038/sdata.2016.18](https://doi.org/10.1038/sdata.2016.18)
- SNF: [Explanation of the FAIR Data Principles](#)

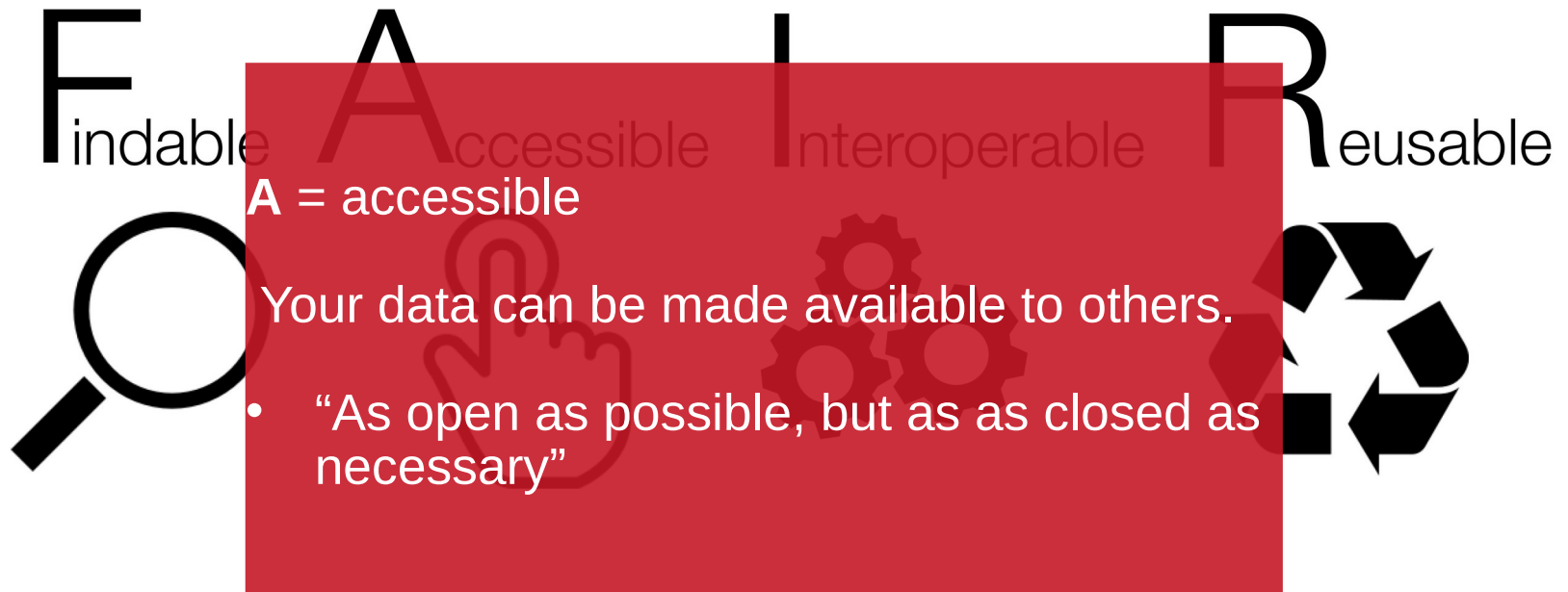


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F indable A ccessible I nteroperable R eusable

I = interoperable

Your data can be integrated with other data
and/or easily used by machines

- standards for data & metadata
- non-proprietary file formats
- references to other (meta-)data

- [FAIR Data Principles](#)
- Wilkinson et al. (2016), The FAIR Guiding Principles for scientific data management and stewardship, Scientific Data 3, [doi:10.1038/sdata.2016.18](https://doi.org/10.1038/sdata.2016.18)
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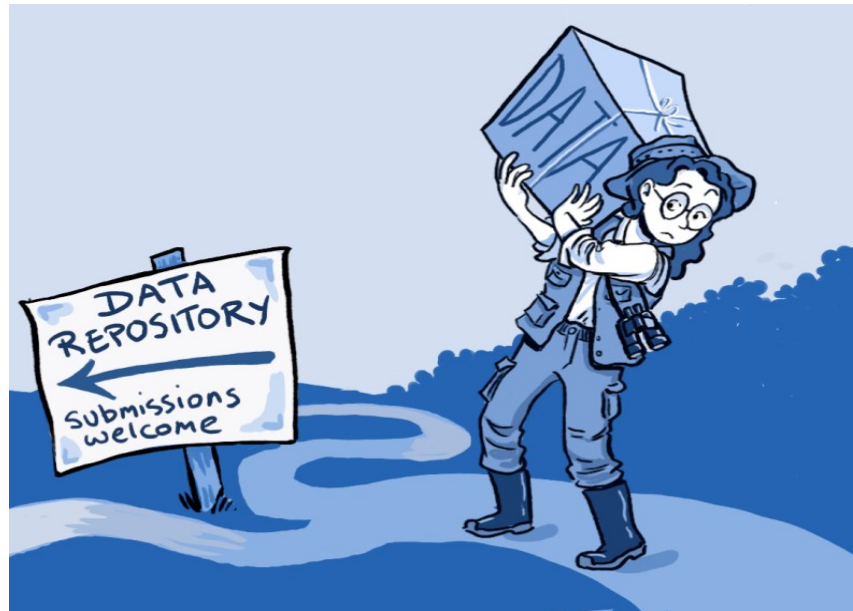
R = re-usable

Your data can be used for new research as well as for replications.

- Data are comprehensibly described with relevant attributes,
 - domain-relevant standards,
 - open licenses,
 - provenance
- [FAIR Data Principles](#)
 - Wilkinson et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship, *Scientific Data* 3, [doi:10.1038/sdata.2016.18](https://doi.org/10.1038/sdata.2016.18)
 - SNF: [Explanation of the FAIR Data Principles](#)



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Picture: Ainsley Seago. doi:10.1371/journal.pbio.1001779.g001

OPEN RESEARCH DATA

NFDI



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- **National Research Data Infrastructure**
- The National Research Data Infrastructure (NFDI) has the objective to systematically index, edit, interconnect and make available the valuable stock of data from science and research.
- Funding for subject- and/or methods-specific consortia
- Overall budget: 85 Mio € per year for 10 years
- 27 subject-specific consortia
- <https://www.nfdi.de/>



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Chemistry Data Days 2023

June 6-7 at JGU Mainz

NFDI4Chem Chemistry Consortium in the NFDI

NFDI4Chem is an initiative to build an open and FAIR infrastructure for research data management in chemistry. NFDI4Chem is supported by the German Chemical Society (GDCh), German Bunsen Society for Physical Chemistry (DBG) and German Pharmaceutical Society (DPhG) – representing approximately 40,000 members – to reach out to the chemistry community as a whole. NFDI4Chem is lead by the Applicant Institution Friedrich-Schiller-University Jena.

What can we do for you?



Events

- Chemical Research Data Management in a Nutshell
09.05.2023 @ 8:30 – 16:30 CEST
 - InChI Workshop on Inorganic Stereochemistry
10.05.2023 @ 11:00 CEST – 11.05.2023 @ 17:00 CEST
 - Chemotion ELN Q&A Session
25.05.2023 @ 15:00 – 16:00 CEST
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We establish a needs-based infrastructure for research data ranging from architecture, art history and musicology to theatre, dance, film and media studies.

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As part of the NFDI, KonsortSWD is expanding its services for research with data in the social, educational, behavioural and economic sciences.

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Science has voted. To the election results →

PRESS RELEASE, 07.02.2023

Researchers between the obligation of confidentiality and the duty of disclosure →

NEWS, 21.03.2023

Second call for applications project funding research data management →

27./28. MARCH 2023, BERLIN

9th Conference on Social and Economic Data →

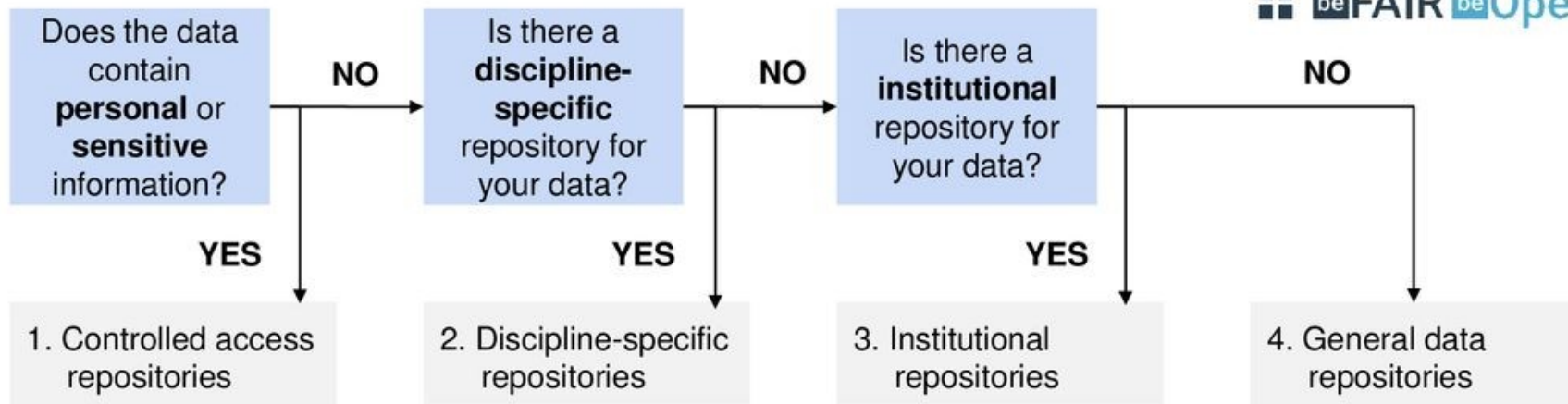


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dbSNP
Short Genetic Variations



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Etc...

Slide adapted from: N. Jareborg (2019), „Data management and repositories“, <https://player.slideplayer.com/105/17629367/>.

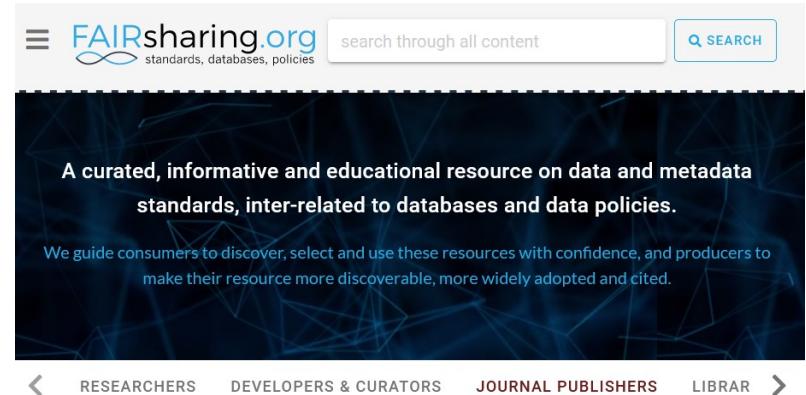
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Data publication



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The UCI Machine Learning Repository is a collection of databases, domain theories, and data generators that are used by the machine learning community for the empirical analysis of machine learning algorithms. It is used by students, educators, and researchers all over the world as a primary source of machine learning data sets. As an indication of the impact of the archive, it has been cited over 1000 times.

OpenML

Open Machine Learning

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OpenML is an open ecosystem for machine learning. By organizing all resources and results online, research becomes more efficient, useful and fun. OpenML is a platform to share detailed experimental results with the community at large and organize them for future reuse. Moreover, it will be directly integrated in today's most popular data mining tools (for now: R, KNIME, RapidMiner and WEKA). Such an easy and free exchange of experiments has tremendous potential to speed up machine learning research, to engender larger, more detailed studies and to offer accurate advice to practitioners. Finally, it will also be a valuable resource for education in machine learning and data mining.



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Additional name(s)	Open Machine Learning
Repository URL	http://www.openml.org/
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Description	<p>OpenML is an open ecosystem for machine learning. By organizing all resources and results online, research becomes more efficient, useful and fun. OpenML is a platform to share detailed experimental results with the community at large and organize them for future reuse. Moreover, it will be directly integrated in today's most popular data mining tools (for now: R, KNIME, RapidMiner and WEKA). Such an easy and free exchange of experiments has tremendous potential to speed up machine learning research, to engender larger, more detailed studies and to offer accurate advice to practitioners. Finally, it will also be a valuable resource for education in machine learning and data mining.</p>
Contact	openmachinelearning@gmail.com
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Keyword(s)	<div>machine learning</div> <div>meta-learning</div> <div>experimental methodology</div> <div>datasets</div> <div>algorithms</div> <div>experiments</div>
Repository size	1700000 machine learning experiments on 19630 datasets and 3370 implementations
Repository type(s)	disciplinary
Mission statement for designated community	http://www.openml.org

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General
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Terms
Standards

Name of repository

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Additional name(s)

heiDATA Institutional Repository for Research Data of Heidelberg University

Repository URL

<https://heidata.uni-heidelberg.de>

Subject(s)

Humanities Social and Behavioural Sciences Economics Jurisprudence Biology Medicine
 Microbiology, Virology and Immunology Agriculture, Forestry, Horticulture and Veterinary Medicine
 Chemistry Physics Geosciences (including Geography)
 Computer Science, Electrical and System Engineering Humanities and Social Sciences Life Sciences
 Agriculture, Forestry, Horticulture and Veterinary Medicine Natural Sciences Engineering Sciences

Description

heiDATA is Heidelberg University's research data repository. It is managed by the Competence Centre for Research Data, a joint institution of the University Library and the Computing Centre. All researchers affiliated with Heidelberg University can use this service for archiving and publishing their data.

Contact

<http://www.data.uni-heidelberg.de/contact.html>

Content type(s)

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 Archived data

Keyword(s)

data processing computer science linguistics economics geograhly history mathematics
 social science chemistry earth sciences modern languages



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Heidelberg
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Metrics

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3D Spatial Data Processing

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Accuracy of rapid point-of-care antigen-based diagnostics for SARS-CoV-2: an updated systematic review and meta-analysis with meta regression analyzing influencing factors [Research Data]

Feb 25, 2022 - Tropical Medicine



Brümmer, Lukas E.; Katzenschlager, Stephan; McGrath, Sean; Schmitz, Stephani; Gaeddert, Mary; Erdmann, Christian; Bota, Marc; Grilli, Maurizio; Larmann, Jan; Weigand, Markus A.; Pollock, Nira R.; Macé, Aurélien; Erkosar, Berra; Carmona, Sergio; Sacks, Jilian A.; Ongarello, Stefano; Denking, Claudia M., 2022, "Accuracy of rapid point-of-care antigen-based diagnostics for SARS-CoV-2: an updated systematic review and meta-analysis with meta regression analyzing influencing factors [Research Data]", <https://doi.org/10.11588/data/T3MIB0>, heiDATA, V1

Background Comprehensive information about the accuracy of antigen rapid diagnostic tests (Ag-RDTs) for SARS-CoV-2 is essential to guide public health decision makers in choosing the best tests and testing policies. In August 2021, we published a systematic review and meta-analysis


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SPDM data capturing radiation induced chromatin conformation changes

Hausmann, Michael; Müller, Patrick; Hillebrandt, Sabina; Bach, Margund; Kaufmann, Rainer; Zhang, Yang, 2015, "SPDM data capturing radiation induced chromatin conformation changes", doi:10.11588/data/10031, heiDATA Dataverse, V3
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Description

Using stably transfected HeLa cells expressing either green fluorescent protein (GFP) labelled histone H2B or yellow fluorescent protein (YFP) labelled histone H2A, we investigated the positioning of individual histone proteins in cell nuclei by means of high resolution localization microscopy (Spectral Position Determination Microscopy = SPDM). The cells were exposed to ionizing radiation of different doses and aliquots were fixed after different repair times for SPDM imaging. In addition to the repair dependent histone protein pattern, the positioning of antibodies specific for heterochromatin and euchromatin was recorded by SPDM.

Experimental data was acquired in the Experimental Biophysics group by Michael Hausmann, Patrick Müller, Sabina Hillebrandt, Margund Bach and Rainer Kaufmann.

Kernel Density Estimations of the experimental data and the maskings of the regions of interest based on the KDEs were calculated by Yang Zhang, a member of the Statistical Physics and Theoretical Biophysics Group.

Related Publication

Zhang Y, Máté G, Müller P, Hillebrandt S, Krufczik M, et al. (2015) Radiation Induced Chromatin Conformation Changes Analysed by Fluorescent Localization Microscopy. Statistical Physics, and Graph Theory. PLoS ONE 10(6): e0128555. doi: 10.1371/journal.pone.0128555

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Files
Metadata
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Versions

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- DOI's



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Findability
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EARTH AND
SPACE SCIENCE



Journal of Geophysical Research: Oceans



RESEARCH ARTICLE

10.1002/2017JC013678

Key Points:

- First bomb-¹⁴C peak reconstruction in the high-latitude NW Pacific made with a high-resolution analysis of long-lived bivalve shells
- Relatively high bomb-¹⁴C peak, though at high latitude (40°N), is due to water transport by Kuroshio Current
- Bomb-¹⁴C record provides a reliable tracer of water mixing

Bomb-¹⁴C Peak in the North Pacific Recorded in Long-Lived Bivalve Shells (*Mercenaria stimpsoni*)

Kaoru Kubota^{1,2,3} , Kotaro Shirai², Naoko Murakami-Sugihara², Koji Seike^{2,4} , Masayo Minami⁵, Toshio Nakamura³, and Kazushige Tanabe⁵

¹Kochi Institute for Core Sample Research, Japan Agency for Marine-Earth Science and Technology, Nankoku, Japan,

²Atmosphere and Ocean Research Institute, University of Tokyo, Chiba, Japan, ³Institute for Space-Earth Environmental

Research, Nagoya University, Furo-cho, Nagoya, Japan, ⁴Now at Geological Survey of Japan, National Institute of

Advanced Industrial Science and Technology, Tsukuba, Japan, ⁵Department of Earth and Planetary Science, University of Tokyo, Bunkyo, Japan



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Journal of Geophysical Research: Oceans

RESEARCH ARTICLE Bomb-¹⁴C Peak in the North Pacific Recorded in Long-Lived

Proceedings of the National Academy of Sciences of the United States of America, 112, 9542–9545.

Guilderson, T. P., Schrag, D. P., Kashgarian, M., & Southon, J. (1998). Radiocarbon variability in the western equatorial Pacific inferred from a high-resolution coral record from Nauru Island. *Journal of Geophysical Research*, 103, 24641–24650.

Hammer, S., & Levin, I. (2017). Monthly mean atmospheric $\Delta^{14}\text{CO}_2$ at Jungfrauoch and Schauinsland from 1986 to 2016 (heiDATA Dataverse V2). Heidelberg: Heidelberg University. <https://doi.org/10.11588/data/10100>

Hanawa, K. (1983). Sea surface temperature off Sanriku coast and east of Tsugaru Strait monitored by ferry Ishikari (I). *Tohoku Geophysical Journal*, 29, 129–149.

Hanawa, K., & Mitsudera, H. (1986). Variation of water system distribution in the Sanriku Coastal Area. *Journal of the Oceanographic Society of Japan*, 42, 435–446.

Hua, Q., Barbetti, M., & Rakowski, A. Z. (2013). Atmospheric radiocarbon for the period 1950–2010. *Radiocarbon*, 55, 2059–2072.

Ishizu, M., Itoh, S., & Tanaka, K. (2016). Influence of the Oyashio Current and Tsugaru Warm Current on the circulation and water properties



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Title ⓘ	GECCA mapped
Subtitle ⓘ	Mapping Western Group Exhibitions of Contemporary Chinese Art after 1979
Author ⓘ	Franziska Koch (Heidelberg Centre for Transcultural Studies, Global Art History, Heidelberg University, Germany)
Contact ⓘ	Use email button above to contact. Franziska Koch (Heidelberg Centre for Transcultural Studies, Global Art History, Heidelberg University, Germany)
Description ⓘ	<p>GECCA mapped is a pilot project that visualizes and provides geo-referential metadata of sixty exhibition entries collected in the larger GECCA data base (more than 700 entries). The exhibition sample is limited to Western, i.e. Western European and Northern American group exhibitions, and excludes bi-/ triennials. With the support of the HRA (Heidelberg Research Architecture), GECCA mapped allows the user to trace the exhibition sample implemented in Google Earth. The GECCA mapped logo indicates the place where a particular exhibition was staged and is scaled according to the number of participating artists. A click on the logo opens a pop-up window presenting more information on the exhibition. The Google Earth timeline enables the user to follow the exhibition development in any chosen geographical area in the period from 1982 (earliest exhibition entry) to 2009 (latest exhibition entry).</p> <p>Group Exhibitions of Contemporary Chinese Art (GECCA): The medium of (group and panoramic) exhibitions has played a fundamental role in creating a global context for Chinese art within and outside of the People's Republic after the end of the "Great Proletarian Cultural Revolution" (1966-1976) and since the political reforms initiated by Deng Xiaoping in 1978/79. In economic, discursive, aesthetic and institutional terms, the Western reception of these shows was very influential for the establishment of a certain international canon of artworks, artists and curators. This particular canon in fact came to be considered representative of the whole of Chinese artistic production, although it actually tends to exclude large parts of the overall artistic activity such as "national ink painting" (guohua), conventional or conservative academic oil painting, as well as those works involving political or consumption oriented subject matter, including mass-produced decorative and popular artworks.</p> <p>With 60 exhibitions entries, the data that GECCA mapped visualizes is a comparatively small sample of the database GECCA - which contains more than 700 exhibition entries. The data was individually researched and includes information on the location, institution, dates, exhibition topic, participating artists and curators. The sources for the data stem from exhibition catalogues, museum websites, archival documentation of public art libraries and other archives.</p> <p>A typical use of the kmz-file that visualizes GECCA mapped is Google Earth.</p>
Subject ⓘ	Arts and Humanities
Keyword ⓘ	<p>contemporary Chinese art group exhibitions North America (general region) (TGN) http://vocab.getty.edu/tn/7029440 Europe (continent) (TGN) http://vocab.getty.edu/tn/1000003 Australia (nation) (TGN) http://vocab.getty.edu/tn/7000490 Art, Chinese--20th century--Exhibitions (LCSH) http://id.loc.gov/authorities/subjects/sh2007101410 GECCA mapped Geographic information systems (LCSH) http://id.loc.gov/authorities/subjects/sh90001880 Digital mapping (LCSH) http://id.loc.gov/authorities/subjects/sh85037980</p>
Related Publication ⓘ	<p>Koch, Franziska. 2016. „Die »chinesische Avantgarde« und das Dispositiv der Ausstellung: Konstruktionen chinesischer Gegenwartskunst im Spannungsfeld der Globalisierung". Bielefeld: transcript. isbn: 978-3-8376-2617-9 http://www.transcript-verlag.de/978-3-8376-2617-9/die-chinesische-avantgarde-und-das-dispositiv-der-ausstellung</p> <p>Chinese: English</p>

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Title ⓘ	GECCA mapped
Subtitle ⓘ	Mapping Western Group Exhibitions of Contemporary Chinese Art after 1979
Author ⓘ	Franziska Koch (Heidelberg Centre for Transcultural Studies, Global Art History, Heidelberg University, Germany)
Contact ⓘ	Use email button above to contact.
Description ⓘ	<p>Franziska Koch (Heidelberg Centre for Transcultural Studies, Global Art History, Heidelberg University, Germany)</p> <p>GECCA mapped is a pilot project that visualizes and provides geo-referential metadata of sixty exhibition entries collected in the larger GECCA data base (more than 700 entries). The exhibition sample is limited to Western, i.e. Western European and Northern American group exhibitions, and excludes bi-/ triennials. With the support of the HRA (Heidelberg Research Architecture), GECCA mapped allows the user to trace the exhibition sample implemented in Google Earth. The GECCA mapped logo indicates the place where a particular exhibition was staged and is scaled according to the number of participating artists. A click on the logo opens a pop-up window presenting more information on the exhibition. The Google Earth timeline enables the user to follow the exhibition development in any chosen geographical area in the period from 1982 (earliest exhibition entry) to 2009 (latest exhibition entry).</p> <p>Group Exhibitions of Contemporary Chinese Art (GECCA): The medium of (group and panoramic) exhibitions has played a fundamental role in creating a global context for Chinese art within and outside of the People's Republic after the end of the "Great Proletarian Cultural Revolution" (1966-1976) and since the political reforms initiated by Deng Xiaoping in 1978/79. In economic, discursive, aesthetic and institutional terms, the Western reception of these shows was very influential for the establishment of a certain international canon of artworks, artists and curators. This part the whole of Chinese artistic production, although it actually tends to be "national ink painting" (guohua), conventional or conservative academic consumption oriented subject matter, including mass-produced decorative</p> <p>With 60 exhibitions entries, the data that GECCA mapped visualizes is which contains more than 700 exhibition entries. The data was individual institution, dates, exhibition topic, participating artists and curators. The museum websites, archival documentation of public art libraries and other</p> <p>A typical use of the kmz-file that visualizes GECCA mapped is Google</p> <p>Arts and Humanities</p> <p>contemporary Chinese art group exhibitions North America (general region) (TGN) http://vocab.getty.edu/tgn/7029 Europe (continent) (TGN) http://vocab.getty.edu/tgn/1000003 Australia (nation) (TGN) http://vocab.getty.edu/tgn/7000490 Art, Chinese--20th century--Exhibitions (LCSH) http://id.loc.gov/authorities/subjects/sh90001880 GECCA mapped Geographic information systems (LCSH) http://id.loc.gov/authorities/subjects/sh85037980 Digital mapping (LCSH) http://id.loc.gov/authorities/subjects/sh85037980</p> <p>Koch, Franziska. 2016. „Die »chinesische Avantgarde« und das Dispositiv der Ausstellung: Konstruktionen chinesischer Gegenwartskunst im Spannungsfeld der Globalisierung". Bielefeld: transcript. isbn: 978-3-8376-2617-9 http://www.transcript-verlag.de/978-3-8376-2617-9/die-chinesische-avantgarde-und-das-dispositiv-der-ausstellung</p> <p>Chinese: English</p>
Subject ⓘ	Arts and Humanities
Keyword ⓘ	contemporary Chinese art group exhibitions North America (general region) (TGN) http://vocab.getty.edu/tgn/7029 Europe (continent) (TGN) http://vocab.getty.edu/tgn/1000003 Australia (nation) (TGN) http://vocab.getty.edu/tgn/7000490 Art, Chinese--20th century--Exhibitions (LCSH) http://id.loc.gov/authorities/subjects/sh90001880 GECCA mapped Geographic information systems (LCSH) http://id.loc.gov/authorities/subjects/sh85037980 Digital mapping (LCSH) http://id.loc.gov/authorities/subjects/sh85037980
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Life Sciences Metadata

Design Type ⓘ	Not Specified
Factor Type ⓘ	Cell Type/Cell Line, Developmental Stage, Organism
Organism ⓘ	Homo sapiens; Mus musculus
Other Organism ⓘ	Monodelphis domestica
Measurement Type ⓘ	transcription profiling
Technology Type ⓘ	nucleotide sequencing
Other Technology Type ⓘ	single nucleus RNA-seq
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MW Setz, S Listl, A Bartols, I Schubert, ... - *chronic disease*, 2019 - ncbi.nlm.nih.gov
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Trautmann, Stefan; Brown, Martin; Vlahu, Razvan
2016-05-03

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We study experimental coordination games to examine through which transmission channels, and under which information conditions, a panic-based depositor-run at one bank may trigger a panic-based depositor-run at another bank. We find that withdrawals at one bank trigger withdrawals at another bank by increasing players' beliefs that other depositors in their own bank will withdraw, making them more likely to withdraw as well. Observed withdrawals only affect depositors' beliefs, and are thus contagious, when they form an informative signal about bank fundamentals.

Bank runs Contagion Social Sciences Systemic risk

Identifier	
DOI	https://doi.org/10.11588/data/10074
Related Identifier	https://doi.org/10.1287/mnsc.2015.2416
Metadata Access	https://heidata.uni-heidelberg.de/oi/?verb=GetRecord&metadataPrefix=oai_datacite&urlbase=https://doi.org/10.11588/data/10074

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Publication Status

Published (14)

Draft (1)

Author Name

Rominger, Frank (7)

Mastalerz, Michael (5)

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Reinhard, Dennis; Rominger, Frank; Mastalerz, Michael, 2022, "Desymmetrization Strategy to Achieve Triptycene-Based 3,6-Dimethoxytriphenylenes via Oxidative Cyclodehydrogenation [Data]", <https://doi.org/10.11588/data/OH6757>, heiDATA, V1

To achieve a highly symmetric triptycene based hexamethoxytriphenylene in high yield of 97 %, a less symmetric triptycene (C3v) is necessary as precursor for cyclodehydrogenative Scholl-type oxidation, by taking into account the regioselectivity of the C-C bond formation controll...



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


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Apel, Jochen, 2022, "Test Dataset", <https://doi.org/10.11588/data/CKSXU7>, heiDATA, DRAFT
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<input type="checkbox"/>	1.0	This is the first published version.	Leonhard Maylein, Hubert Mara, Jochen Apel	Jun 6, 2019

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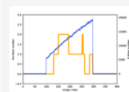
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Stochastic dynamics of a few sodium atoms in presence of a cold potassium cloud [data]

Version 2.0



Bhatt, Rohit Prasad; Kilinc, Jan; Höcker, Lilo; Jendrzejewski, Fred, 2021, "Stochastic dynamics of a few sodium atoms in presence of a cold potassium cloud [data]", <https://doi.org/10.11588/data/HRCX1P>, heiDATA, V2, UNF:6JJxjDHuluVKxO7FoMyqIAw== [fileUNF]

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We provide the data and our jupyter notebooks used to generate the figures of our publication. Abstract: Single particle resolution is a requirement for numerous experimental protocols that emulate the dynamics of small systems in a bath. Here, we accurately resolve through atom counting the stochastic dynamics of a few sodium atoms in presence of a cold potassium cloud. This capability enables us to rule out the effect of inter-species interaction on sodium atom number dynamics, at very low atomic densities present in these experiments. We study the noise sources for sodium and potassium in a common framework. Thereby, we assign the detection limits to 4.3 atoms for potassium and 0.2 atoms (corresponding to 96% fidelity) for sodium. This opens possibilities for future experiments with a few atoms immersed in a quantum degenerate gas.

Subject ⓘ

Physics

Keyword ⓘ

Ultracold mixture, Stochastic dynamics

Related Publication ⓘ

Bhatt, R., Kilinc, J., Höcker, L., Jendrzejewski, F. Stochastic dynamics of a few sodium atoms in presence of a cold potassium cloud. Sci. Rep. doi: [10.1038/s41598-022-05778-8](https://doi.org/10.1038/s41598-022-05778-8)

Notes ⓘ

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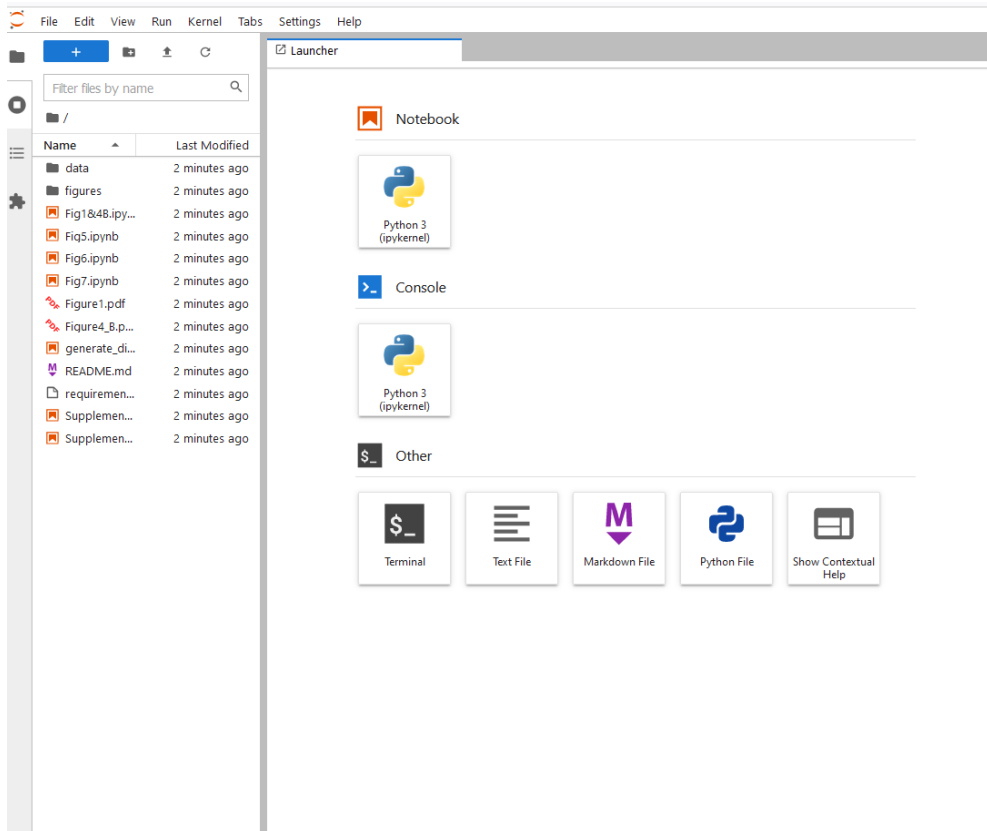
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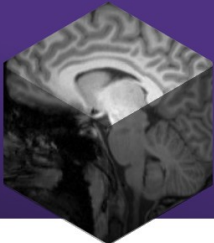
OpenNEURO

SEARCH SUPPORT FAQ Sign in

OpenNeuro MRI


The OpenNeuro platform was developed by the [Stanford Center for Reproducible Neuroscience](#) as a tool to encourage and enhance data sharing and analysis of raw MRI data, using [BIDS](#) to organize and standardize these data.


18.165 Participants **518** Public Datasets





- **Domain-specific metadata enable specific functionalities and more effective retrieval.**


Search MRI Portal


Keywords  Loading Results... [CLEAR ALL](#)

Enter Keyword(s) to Search 

Choose Modality 

Age of Participants 

20  30

Number of Participants 



Diagnosis 


Healthy / Control

Schizophrenia

ADD/ADHD

Alzheimers

MODALITY: MRI  AGE: 20 - 30 

Sort BY: Relevance 

Increasing stimulus similarity drives nonmonotonic representational change in hippocampus

Uploaded by: Compmem Lab on 2022-01-20 - about 1 month ago | Updated: 2022-01-11 - about 2 months ago

MODALITY: MRI

TASKS: AB Pairs Random Ordered

OPENNEURO ACCESSION NUMBER: ds004006 SESSIONS: 1 PARTICIPANTS: 41

PARTICIPANTS' AGES: 18 - 35 SIZE: 110.45GB FILES: 721



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Body Motor

OpenNeuro Accession Number: ds003972 Files: 122 Size: 3.62GB

BIDS Validation 3 WARNINGS Valid

We found 3 Warnings in your dataset. You are not required to fix warnings, but doing so will make your dataset more BIDS compliant.

[VIEW 3 WARNINGS IN 74 FILES](#)

Warning: 1 [VIEW 14 FILES](#)

Not all subjects/sessions/runs have the same scanning parameters.

Warning: 2 [VIEW 30 FILES](#)

Tabular file contains custom columns not described in a data dictionary

Warning: 3 [VIEW 30 FILES](#)

The onset of the last event is after the total duration of the corresponding scan. This design is suspiciously long.

Download Metadata

Body Motor

CHANGES

dataset_description.json

participants.json

participants.tsv

README

Authors
Schellekens, W., Bakker, C., Ramsey, N.F., Petridou, N.

Available Modalities

Versions
1.0.0 [Versions](#)
Created: 2021-12-10

Tasks
Body Motor

Uploaded by
Wouter Schellekens on 2022-01-04 - about 2 months ago

Last Updated
2021-12-10 - 3 months ago

Sessions
1

Participants
8

Dataset DOI
[doi:10.18112/openneuro.ds003972.v1.0.0](https://doi.org/10.18112/openneuro.ds003972.v1.0.0)

- Domain-specific metadata enable specific functionalities and more effective retrieval.
- **Data standards are implemented and data are validated against these standards.**

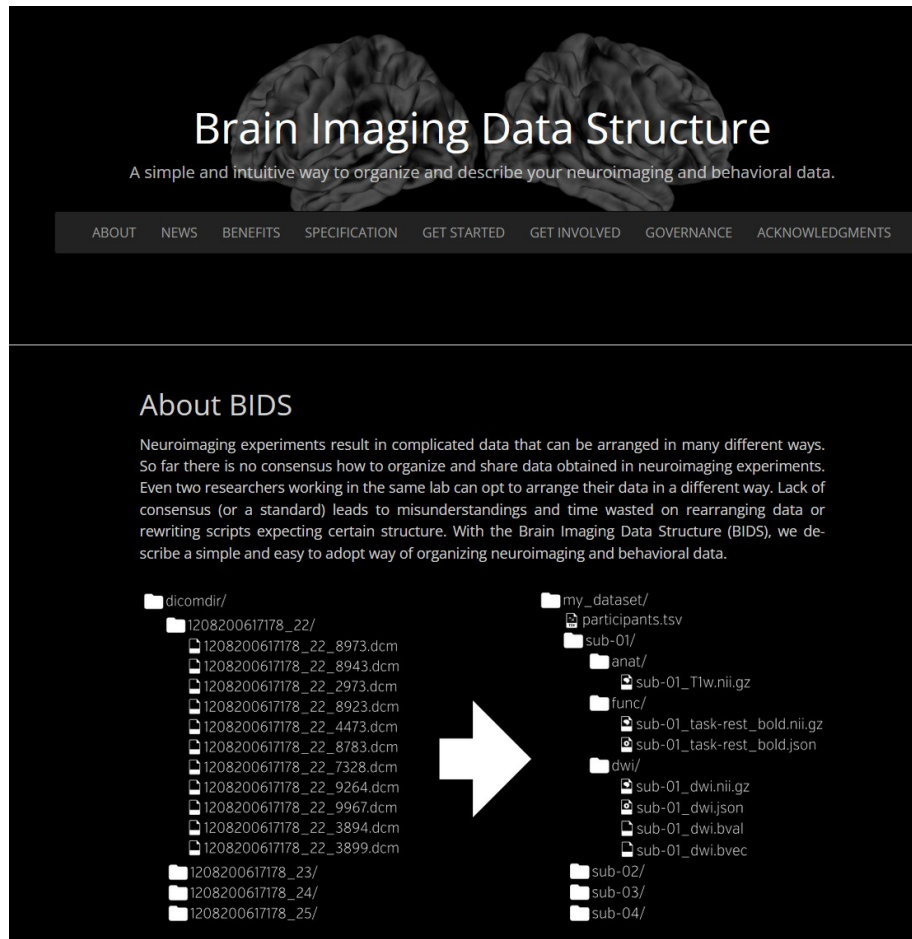


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The screenshot shows the Brain Imaging Data Structure (BIDS) website. At the top, there's a header with the title "Brain Imaging Data Structure" and a subtitle "A simple and intuitive way to organize and describe your neuroimaging and behavioral data." Below this is a navigation bar with links: ABOUT, NEWS, BENEFITS, SPECIFICATION, GET STARTED, GET INVOLVED, GOVERNANCE, and ACKNOWLEDGMENTS. The main content area is titled "About BIDS" and contains a paragraph explaining the need for a standard in neuroimaging data organization. Below the text, a diagram illustrates the BIDS structure. On the left, a "dicomdir/" folder contains a list of DICOM files (e.g., 1208200617178_22_8973.dcm). A large white arrow points from this folder to a "my_dataset/" folder on the right. The "my_dataset/" folder contains a "participants.tsv" file, a "sub-01/" subdirectory, and "sub-02/", "sub-03/", and "sub-04/" subdirectories. The "sub-01/" directory contains "anat/" (with "sub-01_T1w.nii.gz"), "func/" (with "sub-01_task-rest_bold.nii.gz" and "sub-01_task-rest_bold.json"), and "dwi/" (with "sub-01_dwi.nii.gz", "sub-01_dwi.json", "sub-01_dwi.bval", and "sub-01_dwi.bvec").

- Domain-specific metadata enable specific functionalities and more effective retrieval.
- **Data standards are implemented and data are validated against these standards.**



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Share data About Login

Search (e.g. brain or neuroscience)

SEARCH

CATEGORIES

Project	124
Dataset	1215
Model	107
Software	163
Contributor	1763

FILTERS

Reset

MODALITY

<input type="checkbox"/> microscopy	828
<input type="checkbox"/> neuroimaging	754
<input type="checkbox"/> histological approach	596
<input type="checkbox"/> anatomical approach	586
<input type="checkbox"/> anatomy	232
<input type="checkbox"/> neural connectivity	210
<input type="checkbox"/> histology	208
<input type="checkbox"/> expression characterization	100
<input type="checkbox"/> electrophysiology	99
<input type="checkbox"/> multimodal research	90

[View more](#)

SPECIES

<input type="checkbox"/> Homo sapiens	852
<input type="checkbox"/> Mus musculus	155
<input type="checkbox"/> Rattus norvegicus	115
<input type="checkbox"/> Macaca fascicularis	33
<input type="checkbox"/> Macaca mulatta	14
<input type="checkbox"/> Mustela putorius	4
<input type="checkbox"/> Chlorocebus aethiops sabaeus	2
<input type="checkbox"/> Danio rerio	1
<input type="checkbox"/> Monodelphis domestica	1

Viewing 1-20 of 1215 results

Sort by Relevance

1000BRAINS study, connectivity data (v1.1)

The human brain shows considerable interindividual variability, particularly during the course of aging, which is influenced by genetic and environmental factors. To characterize this variability across a wide range o...

Keywords:

🔍 imaging

Methods:

- 🔍 diffusion-weighted magnetic resonance imaging (DWI)
- 🔍 fiber tract reconstructions
- 🔍 Spatial atlas registration

Preprocessed data from the Individual Brain Charting (IBC) project

We present the preprocessed version of the Individual Brain Charting dataset – a high spatial-resolution, multi-task, functional Magnetic Resonance Imaging dataset, intended to support the investigation on the function...

Keywords:

- 🔍 attention
- 🔍 audition
- 🔍 behaviour assay

Methods:

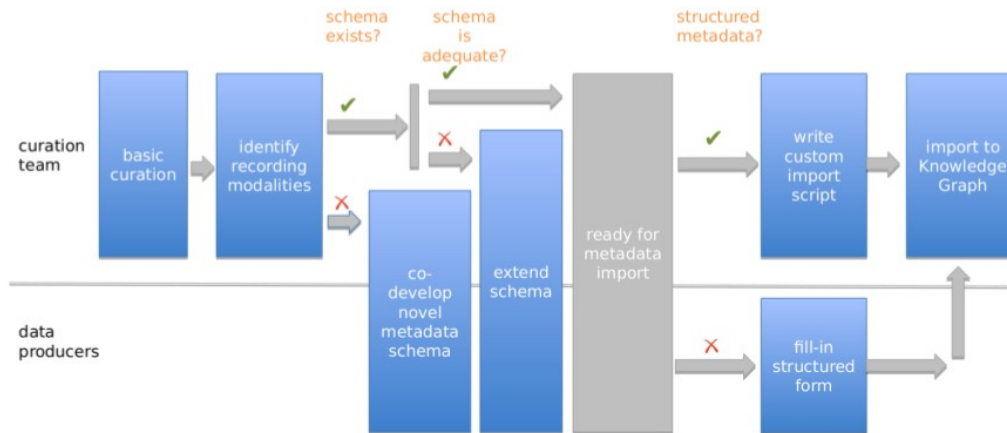
- 🔍 functional magnetic resonance imaging (fMRI)
- 🔍 nonlinear image registration
- 🔍 nonlinear transformation
- 🔍 rigid motion correction
- 🔍 anatomical segmentation technique

- Domain-specific metadata enable specific functionalities and more effective retrieval.
- Data standards are implemented and data are validated against these standards.
- **May be limited with regard to data types (e.g. OpenNeuro only accepts human-derived data)**

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<https://wiki.ebrains.eu/bin/view/Collabs/tier-3-data-curation/Data%20Curator%27s%20Handbook/>

- Domain-specific metadata enable more effective retrieval or specific functionalities.
- Data standards are implemented and data are validated against these standards.
- May be limited with regard to data types (e.g. OpenNeuro only accepts human-derived data)
- **Optional, depending on the repository: Data curators with specific expertise supervise data publication and help preparing data for deposit.**



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Finding data journals



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



scientific data

[View all journals](#) [Search](#) [Log in](#)

[Explore content](#) [About the journal](#) [Publish with us](#)

[Sign up for alerts](#) [RSS feed](#)

[nature](#) > scientific data

Dynamic World, Near real-time global 10m land use land cover mapping

Christopher F. Brown, Steven P. Brumby ... Alexander M. Tait
Data Descriptor | 09 June 2022





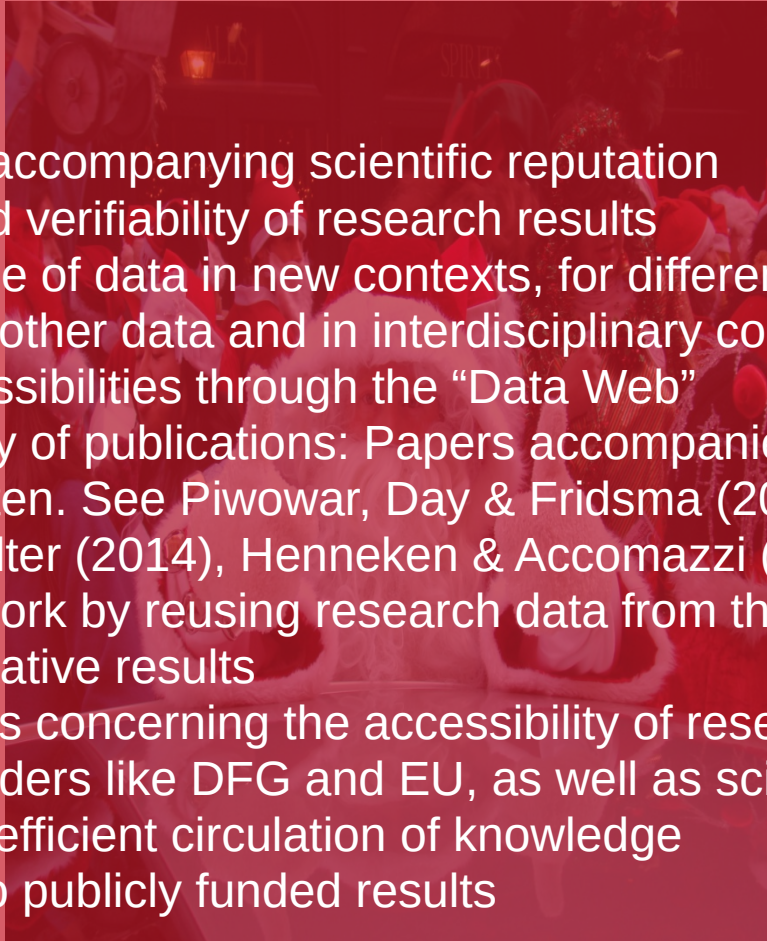
Data publication - pros and cons?

Contra

- My data are neither useful nor interesting for others.
- I want to publish my results first, before someone else uses my data.
- There is no time and no money for data processing and curation.
- My data contain personal data – personal rights, difficult search for test persons, anonymising impossible.
- My data include copyrighted material.
- My funder has no interest in making the data publicly accessible.
- My data will not be understood or will be misunderstood. People will bother me with emails.
- There is no incentive. Why should I do all the work?

Pro

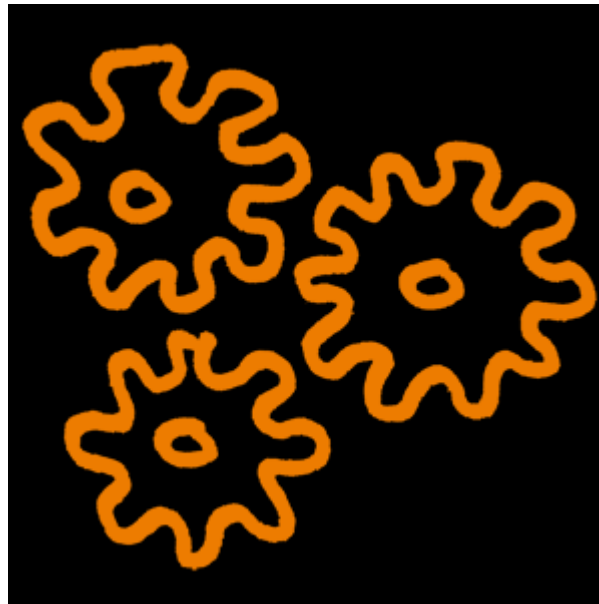
- Visibility and the accompanying scientific reputation
- Transparency and verifiability of research results
- Possibility of reuse of data in new contexts, for different problems in combination with other data and in interdisciplinary contexts
- New research possibilities through the “Data Web”
- Increased visibility of publications: Papers accompanied by research data are cited more often. See Piwowar, Day & Fridsma (2007), Piwowar & Vision (2013), Belter (2014), Henneken & Accomazzi (2011)
- Avoid duplicate work by reusing research data from third parties.
- Availability of negative results
- Fulfil requirements concerning the accessibility of research material as demanded by funders like DFG and EU, as well as scientific journals.
- Faster and more efficient circulation of knowledge
- Right of access to publicly funded results



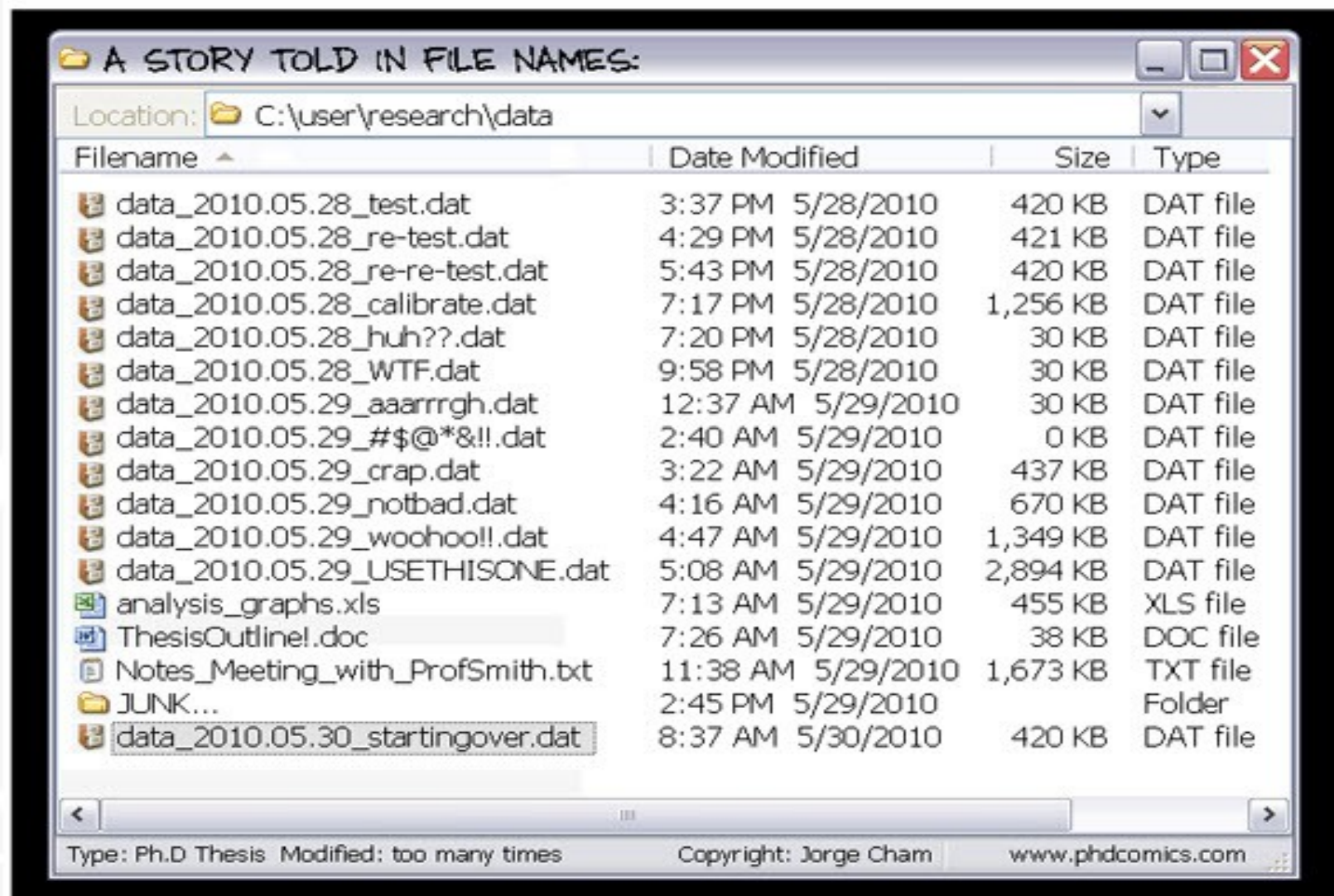


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Data Handling Storage & Archiving – some practical issues....



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Data Handling Storage & Archiving



File handling

- Data best practices (file naming, formats, versioning,...):
<https://guides.library.stanford.edu/data-best-practices/>
- Make different versions of data distinguishable. Conventions for file naming – for you and in your research group.
- File names should deliver context. Distinguish a file from similar but different datasets and from different versions of the same dataset.
- Files may leave their folders. File names should be unique and descriptive without a directory structure.
- **Never delete your raw data!**
- But delete versions of processed data you do not need any longer.



Data Storage & Archiving – some practical issues....



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Backup

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

- At least 3 copies per file...
- ...on at least 2 different media...
- and 1 at a different spatial location.



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EXTERNAL REQUIREMENTS & POLICIES



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Picture: <https://www.flickr.com/photos/raummaschine/9214045295/>



SATZUNG ZUR SICHERUNG GUTER WISSENSCHAFTLICHER PRAXIS UND ZUM UMGANG MIT WISSENSCHAFTLICHEM FEHLVERHALTEN

in der Fassung vom 28.09.2021

Präambel

Zur Wahrnehmung ihrer Verantwortung in den drei Handlungsfeldern Forschung, Studium und Lehre sowie Wissenstransfer trifft die Universität Heidelberg im gesetzlichen Rahmen Vorkehrungen zur Verankerung einer Kultur der guten wissenschaftlichen Praxis. Der Senat hat deshalb in seiner Sitzung vom 28.09.2021 gemäß § 3 Abs. 5 S. 4 LHG i.V.m. § 19 Abs. 1 S. 2 Nr. 10 LHG die folgenden Regelungen beschlossen, durch die die Leitlinien zur Sicherung guter wissenschaftlicher Praxis der Deutschen Forschungsgemeinschaft (DFG) vom August 2019 rechtsverbindlich umgesetzt werden:



Policies & external requirements



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Heidelberg University

[Rules for safeguarding good academic practice and handling academic misconduct](#)

§ 10 Documentation

(1) Researchers must document all information relevant to the establishment of a research result with the degree of transparency that is required and appropriate in the respective field. The same applies to individual results that do not support the research hypothesis. There must be no selection of results in such cases. Where research software is developed, the source code must be documented.

(2) The information required to understand the research, in particular research data and methodological, evaluation and analysis steps, is recorded. Third parties are to be given access to this information where this is possible.



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[Rules for safeguarding good academic practice and handling academic misconduct](#)

§ 11 Public access to research findings

“Researchers decide on their own responsibility whether, how and where to make their research findings publicly available. If they decide to publish their results, the data and principal materials upon which the published work is based must be stored in recognised archives and repositories where this is possible. The provisions of § 14 must be observed.”



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§ 16 Archiving

“(1) Once they have been made publicly available, research data and findings, and particularly the materials on which they are based, as well as the instruments and, where applicable, the research software used, must be backed up by adequate means according to the standards of the respective field and stored for the legally required time period (usually ten years). A shortening of this storage period must be justified. The storage period begins when the materials are first made publicly available.

(2) The materials are archived a) in the researchers' home institution or b) in repositories serving several locations. In case a) the university will provide the necessary infrastructure for archiving. The selected publication medium must make reference to the archiving location in an appropriate manner.”



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RESEARCH DATA POLICY

RICHTLINIEN FÜR DAS MANAGEMENT VON FORSCHUNGSDATEN

Die Verfügbarkeit von Forschungsdaten ist die Gewähr für die Nachvollziehbarkeit und Überprüfbarkeit sowie die weitergehende Nutzung nach der Veröffentlichung. Sie ist ein zentraler Aspekt guter wissenschaftlicher Praxis der Universität. Ihr Management nach höchsten Standards baut auf diesem Prinzip auf und ist Teil der Exzellenzstrategie.

1. Die Verantwortlichkeit für den Lebenszyklus(*) von Forschungsdaten, insbesondere die Sicherstellung und Bereitstellung der Forschungsdaten zur langfristigen Archivierung liegt primär beim Projektverantwortlichen (PI).
2. Teil jedes Forschungsprojektes ist ein Plan für das Datenmanagement, der explizit adressiert, wie die Akkuratheit, Vollständigkeit, Authentizität, Integrität, Vertraulichkeit, Veröffentlichung und der offene Zugang von Daten gehandhabt werden. Dabei werden fachspezifische Besonderheiten berücksichtigt.
3. Die Universität unterstützt nach bestem Vermögen die PIs durch ein Kompetenzzentrum Forschungsdaten. Es bietet Beratung und Unterstützung bei der Entwicklung von Konzepten für ihr Datenmanagement an. Dafür ist eine frühzeitige Kontaktaufnahme vor oder zu Projektbeginn erforderlich.
4. Der Plan für das Management von Forschungsdaten stellt den Zugriff und die Nutzung unter Einhaltung von ethischen und Open Access-Prinzipien unter geeigneten Sicherheitsmaßnahmen sicher. Der Open-Access-Policy der Universität folgend ermuntert die Universitätsleitung Wissenschaftler ausdrücklich, Forschungsdaten gemäß der Grundsätze von Open Access, wie sie in der „Berliner Erklärung über offenen Zugang zu wissenschaftlichem Wissen“ von 2003 beschrieben sind, zugänglich zu machen, solange keine entgegenstehenden rechtlichen Verpflichtungen bestehen (insb. Verträge mit Verlagen). Für Daten, die Grundlage von schutzfähigem, geistigem Eigentum sind, gilt grundsätzlich die Verpflichtung zur Einreichung einer Erfindungsmeldung gemäß Arbeitnehmererfindungsgesetz (§§ 5, 42 Nr. 2) und die IP-Policy der Universität Heidelberg vorrangig.
5. Die persönlichen Daten von Probanden, Patienten und andere von Datenerhebungen betroffenen Personen werden gemäß den Datenschutzrichtlinien geschützt.
6. Daten, die außerhalb der Universität als Teil des Datenmanagementplans bereitgehalten werden, sollten beim Kompetenzzentrum Forschungsdaten registriert werden. Das Kompetenzzentrum Forschungsdaten bietet eine Datenregistrierung an, die Datensätze sowohl aus universitären als auch externen Repositorien nachweist.
7. Alle Rechte an Daten, insbesondere das Recht, die Daten weitergehend zu nutzen oder zu publizieren, sollten den PIs vorbehalten sein und nicht an Dritte vergeben werden.



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RESEARCH DATA POLICY

RICHTLINIEN FÜR DAS MANAGEMENT VON FORSCHUNGSDATEN

Seven paragraphs

- 1) PI's are responsible for the whole research data lifecycle.
- 2) Every research project should develop a data management plan.
- 3) University offers support via the Research Data Unit.
- 4) University encourages researcher to publish open access if possible.
- 5) Importance of data privacy.
- 6) Data published outside of the university's webspace should be registered at the RDU.
- 7) PI's shall keep their right on data use and publication and shall not transfer it to third parties.

[Research Data Policy - Universität Heidelberg \(uni-heidelberg.de\)](https://uni-heidelberg.de/research-data-policy)



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Funders are pushing RDM & Open Data



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[DFG Guidelines on the Handling of Research Data](#)

“[...] For this reason, the handling of research data and the objects on which the data is based have to be carefully planned, documented and described. Wherever possible it is important to enable subsequent use of the research data and potentially also the objects by other users.

[...]

For this reason, the DFG expects research projects to include a description of how research data is handled. The description should be based on the checklist for handling research data

[...]

Costs incurred for the project-specific handling of research data should be requested in connection with the project.[...]”



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Checklist Regarding the Handling of Research Data

1. Data description

How does your project generate new data? Is existing data reused? Which data types (in terms of data formats like image data, text data or measurement data) arise in your project and in what way are they further processed? To what extent do these arise or what is the anticipated data volume?

2. Documentation and data quality

What approaches are being taken to describe the data in a comprehensible manner (such as the use of available metadata, documentation standards or ontologies)? What measures are being adopted to ensure high data quality? Are quality controls in place and if so, how do they operate? Which digital methods and tools (e.g. software) are required to use the data?

3. Storage and technical archiving the project

How is the data to be stored and archived throughout the project duration? What is in



Funders are pushing RDM & Open Data



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Horizon 2020 & Horizon Europe: FAIR Data Management

- Participating projects will be required to develop a **Data Management Plan** (DMP)
- Participating projects are **required to deposit research data**, preferably into a research data repository
- “[...]as far as possible, projects must then **take measures to enable for third parties to access**, mine, exploit, reproduce and disseminate (free of charge for any user) this research data.”
- http://www.dfg.de/foerderung/antrag_gutachter_gremien/antragstellende/nachnutzung_forschungsdaten/
- [Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020](#) | [Guidelines on Data Management in Horizon 2020](#)



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1. Data Summary

What is the purpose of the data collection/generation and its relation to the objectives of the project?

What types and formats of data will the project generate/collect?

Will you re-use any existing data and how?

What is the origin of the data?

What is the expected size of the data?

To whom might it be useful ('data utility')?

2. FAIR data

2. 1. Making data findable, including provisions for metadata

Are the data produced and/or used in the project discoverable with metadata, identifiable and locatable by means of a standard identification mechanism (e.g. persistent and unique identifiers such as Digital Object Identifiers)?

What naming conventions do you follow?

Will search keywords be provided that optimize possibilities for re-use?



Journals: Nature

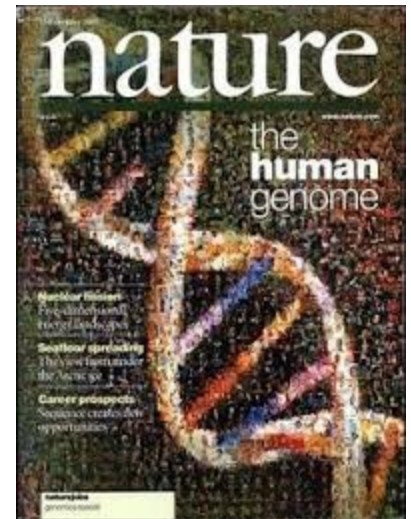


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An inherent principle of publication is that others should be able to replicate and build upon the authors' published claims. A condition of publication in a Nature Portfolio journal is that **authors are required to make materials, data, code, and associated protocols promptly available to readers without undue qualifications.**

[...]Providing large datasets in supplementary information is strongly discouraged and the preferred approach is to make data available in repositories.

<https://www.nature.com/nature-portfolio/editorial-policies/reporting-standards#availability-of-data>



<https://www.nature.com/sdata/policies/repositories>



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Journals: PLOS



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Data Availability

PLOS journals require authors to make all data necessary to replicate their study's findings publicly available without restriction at the time of publication. When specific legal or ethical restrictions prohibit public sharing of a data set, authors must indicate how others may obtain access to the data.

[...]

Publication is conditional on compliance with this policy. If restrictions on access to data come to light after publication, we reserve the right to post a Correction, an Editorial Expression of Concern, contact the authors' institutions and funders, or, in extreme cases, retract the publication. [...]

<https://journals.plos.org/plosone/s/data-availability>



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LEGAL ISSUES



**RESEARCH
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Research data and copyright

- Textual data typically are protected by copyright
- Copy right holder can grant simple or exclusive usage rights
- For publications in subscription journals: typically unlimited and irrevocable transfer of rights to the publishers
- Research data? Facts like measurements generally do not reach the threshold of originality, even though the data collection can be very sophisticated.
- Therefore: According to German copyright law, research data are in many cases not copyrighted.
- But many data are in databases and there is some kind of protection for these (EU directive 96/09/EG, UrhG §§ 87a-e). Virtually all data are useless without documentation. This documentation might very well be protected by copyright.



Creative Commons Licences

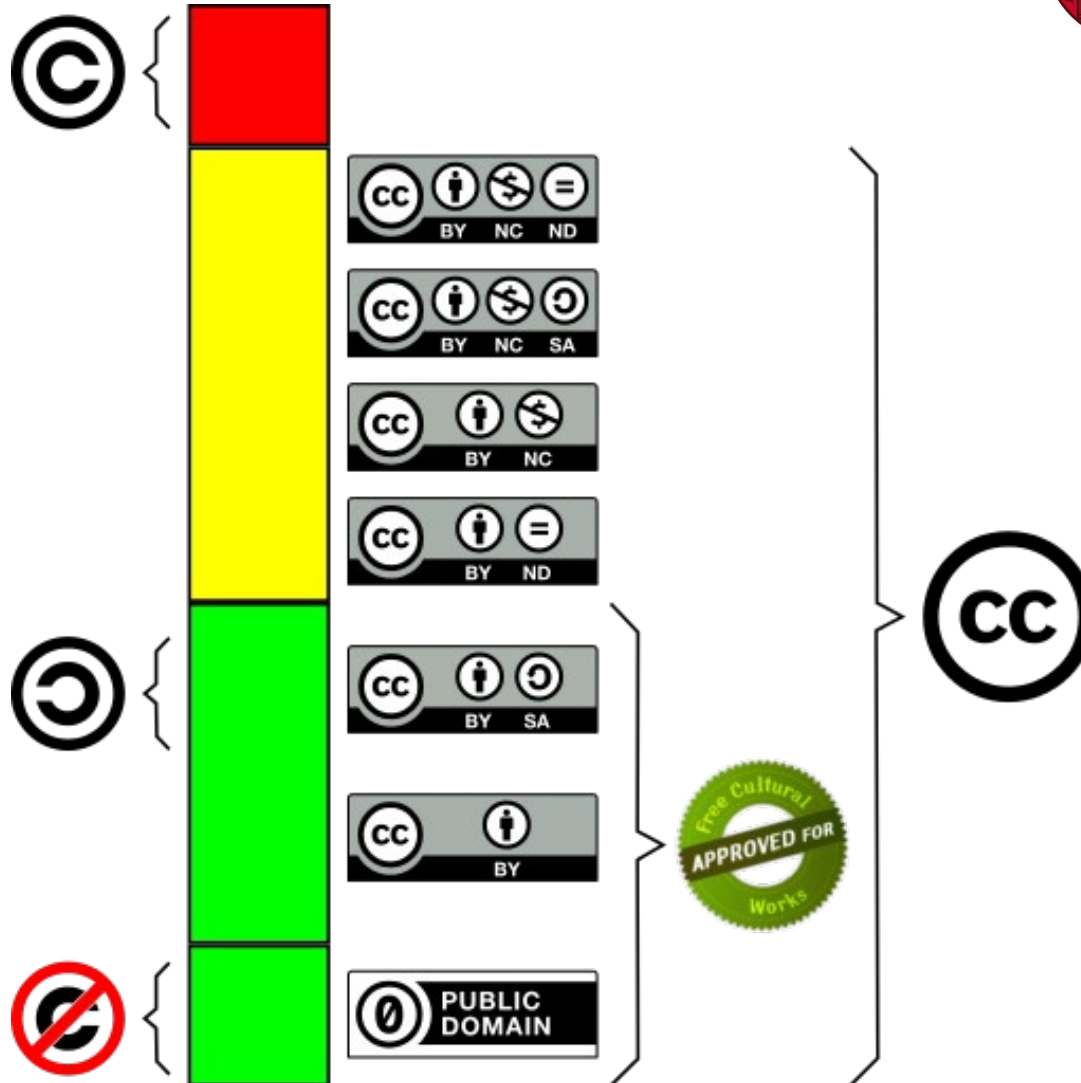
- Standard licences that determine the scope of use of a work
- Combination of layperson-friendly formulation and a legally proper license text adapted to the relevant national law.
- Licence content and metadata are available in machine readable form and can be added to a document. (□ TDM)
- Modular structure with differing “degrees of freedom”
- There are also alternatives, e.g. the Open Data Commons licenses.
- For Software there are specific software licenses



Legal issues



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Data publication and data protection

- Informed consent: data sharing not excluded; information on whether and how data are disseminated

Beispiel UK Data Archive „Managing and Sharing Data“: SAMPLE CONSENT FORM FOR INTERVIEWS

CONSENT FORM FOR [NAME OF PROJECT]		
Please tick the appropriate boxes	Yes	No
Use of the information I provide for this project only		
I understand my personal details such as phone number and address will not be revealed to people outside the project.	<input type="checkbox"/>	<input type="checkbox"/>
I understand that my words may be quoted in publications, reports, web pages, and other research outputs.	<input type="checkbox"/>	<input type="checkbox"/>
Use of the information I provide beyond this project		
I agree for the data I provide to be archived at the UK Data Archive. ^b	<input type="checkbox"/>	<input type="checkbox"/>
I understand that other genuine researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.	<input type="checkbox"/>	<input type="checkbox"/>
I understand that other genuine researchers may use my words in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	<input type="checkbox"/>	<input type="checkbox"/>



Thank you very much!

Dr. Georg Schwesinger
schwesinger@ub.uni-heidelberg.de

Research Data Unit
<https://data.uni-heidelberg.de/>

Dr. Sebastian Zangerle
sebastian.zangerle@ub.uni-heidelberg.de

General Information on RDM
<https://www.forschungsdaten.info/>