BRIDGE OF DATA

OPEN RESEARCH DATA

GDAŃSK UNIVERSITY OF TECHNOLOGY

OPEN SCIENCE COMPETENCE CENTER
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INFOKIT

ABOUT THE PROJECT / KEYNOTE

MOST Wiedzy (Multidisciplinary Open System of Transferring Knowledge "Bridge of Knowledge") is a portal created and set up by Gdańsk University of Technology in 2017, with the aim of supporting scientists to promote their scientific achievements. Open Access Repository of research publications is one of the elements of the portal. By providing the Open Access to full texts of articles, our repository makes them more visible, and enables, facilitates and accelerates scientific communication and cooperation between researchers.

Taking into consideration that the Open Access to research publications is just one of the elements of Open Science, Gdańsk University of Technology together with University of Gdańsk and Medical University of Gdańsk have started to create the research data repository – MOST DANYCH (The Bridge of Data). The repository ensures the infrastructure enabling to archive and make information and resources gathered by scientists in the research process in progress accessible. That is why, MOST DANYCH has a positive impact on increasing accessibility, improving the quality of research and increasing the possibility of reusing scientific resources.

The aim of this guide is to acquaint our readers with the most important issues connected with Open Research Data, which seems to be the excellent starting point to make research data accessible thanks to its concise and attractive form.

COMPETENCE CENTER

Dear researchers,

We are aware that above-mentioned issues can be new for some of you, so we would like to encourage you and help in discovering them by creating Open Science Competence Center, within the project, which aim is to support researchers in all aspects of activity connected with ‚opening' science. Providing various trainings, consultancies, and other actions promoting the idea of opening are willing to show that publishing in an Open Access journal, preparing Data Management Plan or making data accessible in the research data repository is not a complicated process, what is more, it can bring a lot of benefits and can have a positive impact on the promotion and visibility of scientific achievements. If you have any queries, please do not hesitate and contact us at **open-data@pg.edu.pl**

Team of Open Science Competence Center Gdańsk University of Technology Library

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OPEN RESEARCH DATA

WHAT DOES THE TERM ‚RESEARCH DATA' MEAN?

The term Research Data means all data gathered, observed or created when the research process in progress, with the aim of receiving original scientific findings. Depending on how they were created or what they were created for, research data can be distinguished as observational, experimental, simulation or referential data.

Each science discipline creates its own, specific research data, for example, there can be documentary films about animals` behaviour in biology, geographical and spacious data in civil engineering and environment protection, whereas in history – archival documents. All descriptions of procedures, laboratory field notes or information about experiments can be included in research data.

To define research data as ‚**open**' data, data should be made accessible to everybody and be freely used, modified and disseminated.

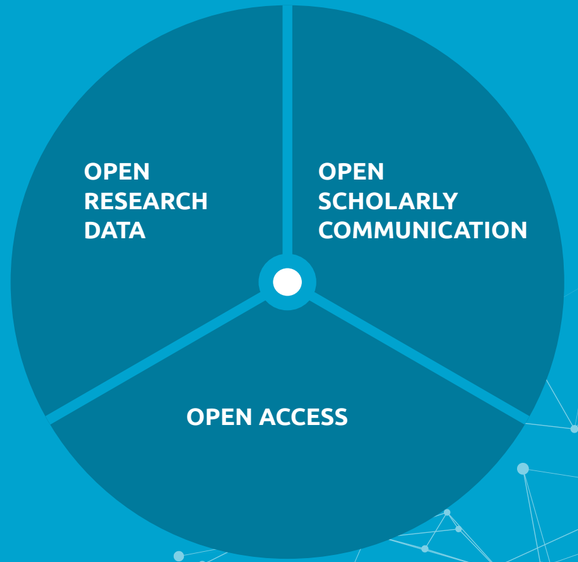
Open Research Data (ORD) are a part of a wider idea, which is an Open Science, with the Open Access (OA) and Open Scholarly Communication (OSC).

WHAT ARE THE BENEFITS OF MAKING RESEARCH DATA MORE ACCESSIBLE?

- better communication and exchanging information between specialists from different science disciplines;
- the possibility to make analyses based on unique data, which cannot be gathered again;
- increasing the number of citations both publications based on data and data themselves;
- the possibility to evaluate the accuracy of conducted research;
- the possibility to use existing resources and lowering the costs of research.

It should be remembered that Open Research Data are not only the possibility but also the necessity more and more frequently. Agencies financing the scientific research often require the Data Management Plan (DMP), whereas publishers and editors require authors to make data used for a scientific publication accessible.

MODEL OF OPEN SCIENCE ACCORDING TO THE EUROPEAN COMMISSION



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DO YOU KNOW THAT...?

European Union is the leader in Open Research Data. The European Commission operates actively to implement ORD initiatives by universities and research centres in the EU.

For more information about the stages of implementing Open Science in EU, see: https://ec.europa.eu/research/openscience

THE RULES OF MAKING RESEARCH DATA ACCESSIBLE - FAIR

The general rule of making research data accessible is: **Data should be as open as possible and as closed as necessary. Research data are usually made accessible in a form of datasets, which means sets which are a separate elements including data related to one publication, scientific project or experiment.**

FAIR RULES

1. FINDABLE

- A dataset provided with metadata allowing to find this set both by people and by computer machines;
- The dataset has a unique identifier (i.e. DOI), which is also the element of metadata description;
- Metadata are indexed in widely available databases enabling to perform a database search.

2. ACCESSIBLE

- The access to the dataset, at least, to metadata is directly possible due to a unique identifier and does not require any additional tools or software;
- Metadata are always available, even if the dataset has been deleted or transferred.

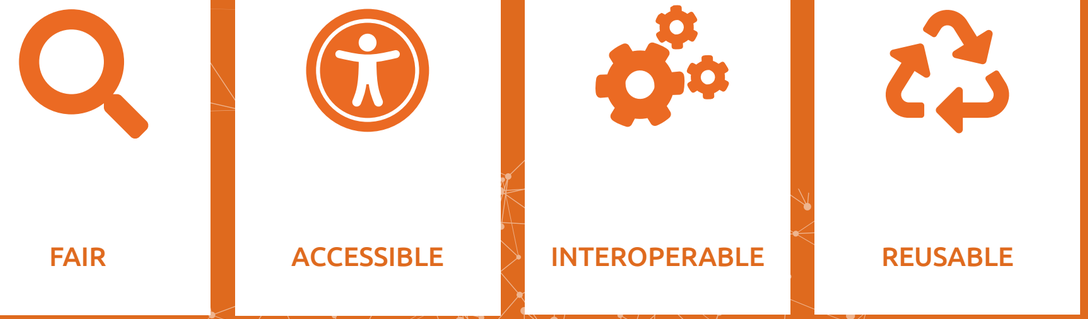
3. INTEROPERABLE

- Data and metadata are delivered in a format enabling to be read easily and processed both by people and computers;
- Datasets and metadata describing them include references to other related resources.

4. REUSABLE

- Metadata include numerous attributes describing precisely the dataset and enabling users to define their usefulness for their own research;
- The dataset includes the license defining the explicit conditions for reusing and processing data;
- Metadata distinctly define the author and the place of creating data;
- Metadata are created according to generally accepted specific standards for each discipline and type of data.

The rules are not rigid, but should be treated as guidelines to use data appropriately. FAIR rules have been created and have been still developed mainly to make data accessible both for users and machines.



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DO YOU KNOW THAT...?

FAIR rules have been still developed and specified by the international society. The GO FAIR initiative organises meetings and workshops about implementing FAIR rules. ‚Metadata 4 Machines' workshop, focuses on the possibility to create metadata understood in the best way for computer programmes, is one of the initiatives.

For more publications and information materials please see www.go-fair.org

DATA MANAGEMENT PLAN

The Data Management Plan (DMP) is a document that outlines activities done at every stage of work with research data. DMP should be created at the early stage of scientific research. Institutions and agencies granting financial funds for scientific research (National Science Centre (NCN), European Commission, Economic and Social Research Council, Natural Environmental Research Council) require DMP increasingly.

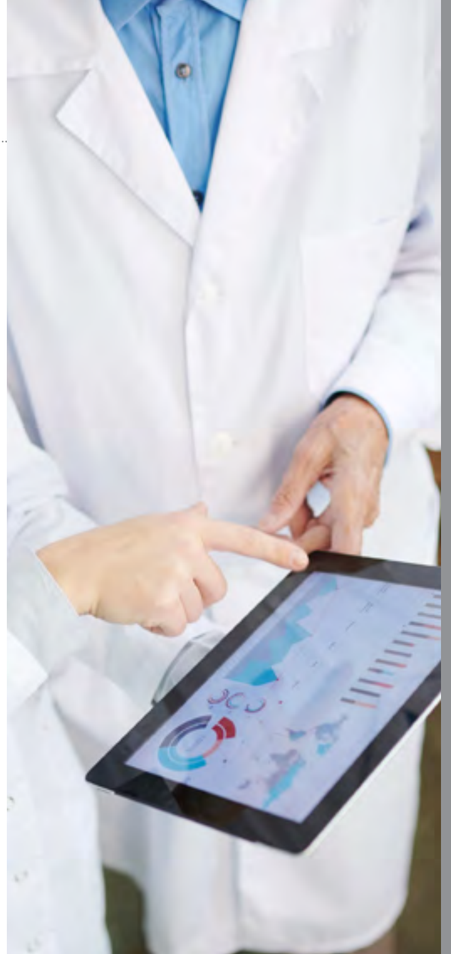
DMP facilitates to plan the procedures related to gaining, processing and sharing research data.

WHAT SHOULD THE DATA MANAGEMENT PLAN CONTAIN?

- The evaluation of accessible data, the description of drawbacks and needs;
- The description of the way of gathering data (i.e. via using a survey, a research tool) and their type (i.e. experimental or observational data);
- Documents and standards of data description (metadata);
- Information about who is supposed to have copyrights and intellectual property rights, and also about the responsibility for managing them;
- Requirements and procedures connected with ethical aspects of gathered data;
- The description of procedures ensuring the quality data control (the description should include the division of duties and activities related to supervising and controlling the completeness of data);
- A plan concerning the access to data and sharing them (defining the license to make data accessible);
- A short- and long-term strategy of storing and protecting data;
- Defining what kind of issues will be needed to conduct DMP.

A GOOD DMP MEANS SOME BENEFITS AS:

- Due to a good planning and managing of gathered data, the quality and credibility of research increase;
- Data can be easily found, the plan allows to work simultaneously with the project;
- The effective data management, preventing from unnecessary copying or overwriting;
- The improvement of data security;
- Easier data preparation for making them accessible later.



RESEARCH DATA MANAGEMENT LIFE CYCLE

DO YOU KNOW THAT...?

DMPonline (https://dmponline.dcc.ac.uk/) is one of the online tools, which can be used to create DMP. DMP including the most important information about your project and adjusted to the specificity of your research and the type of produced data. The portal includes also a wide range of clues and ready-made patterns of DMP required by various institutions financing scientific research (i.e. the European Commission within Horizon 2020 Programme). If the plan is ready, it can be subsequently downloaded and made public.

MAKING RESEARCH DATA READY TO BE ACCESSIBLE

It should be decided if data should be or can be made accessible after gaining them, according to the scientific process and accepted methodology. There are a few steps to be followed at first:

1. A SELECTION – IT IS NOT NECESSARY TO MAKE ALL DATA ACCESSIBLE. THERE ARE SOME CONDITIONS WORTH TAKING INTO CONSIDERATION WHEN CHOOSING DATA TO BE ARCHIVED, SUCH AS:

- Requirements of agencies financing scientific research;
- The scientific value of research data;
- The uniqueness – it is worth checking if data do not duplicate with exiting datasets;
- The possibility to replicate research findings – if data include all parameters allowing to repeat the experiment;
- Economic issues – costs of managing and storing data with their justification.

Note: Research data do not have to be ideal, they can i.e. have gaps in measurements resulting from external factors. It is important to highlight them and describe the causes.

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2. DELETING SENSITIVE DATA ALLOWING INVESTIGATED RESPONDENTS TO BE IDENTIFIED:

- The anonymization – converting personal data to make them impossible to be allocated to a defined or possible to be defined respondent.
- The pseudonymization – converting data in a way they cannot be allocated to a given respondent, without the use of any additional information.

Note: The reversibility is the basic feature distinguishing the pseudonymization and anonymization. The anonymization is an irreversible process, whereas the pseudonymzation is a reversible process.

3. THE CHOICE OF FILES FORMAT

- data should be published in a widely available format, which does not require the commercial software and uses the standard coding (ASCII, UTF-8). It is worth considering the exiting formats in your discipline and not forcing other users to additional conversion of data to avoid losing the quality of data.

4. GIVING PROPER NAMES TO FOLDERS AND FILES

- please try to answer a few questions at first: What files` names and what structure would be the most useful if I want to use them? What should be included in names to find a precise set of data without any problems? The consequence is the basic rule of organising files. The accepted structure and nomenclature should be maintained all the time.

5. GIVING A PROPER DESCRIPTION OF METADATA TO DATASETS

- data should be described to be indexed, found and reused.

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DO YOU KNOW THAT...?

Some of datasets require to be edited or cleaned. There can be errors in datasets concerning inter alia spelling or grammar, or the nominal value (a multiple use of terms). Objects or contexts identifiers should be free from errors too (‚no. of catalogue or ‚place#').

If there is any tool required to ‚clean' gathered data, you can use i.e. OpenRefine (http://openrefine.org/)

METADATA AND METADATA STANDARDS

Metadata are data about data, are the essential element of every dataset according to FAIR rules, and what is more, they are the key to get the access to research data, to understand and reuse them. There are three types of metadata:

• **Descriptive metadata** – give necessary information to find or identify a dataset and can include elements such as a title, a summary, an author and keywords.

• **Structural metadata** – describe relationships and dependence between each object and elements of these datasets to i.e. navigate easily.

• **Administrative metadata** – include helpful information in a given resource management as well as information about the way and date of creating it, a type of a file and information about the access. There are a few administrative subsets, two of them are mentioned frequently as separate types of metadata:

- Metadata of managing rights related to intellectual property rights,

- Metadata of preservation including information necessary to archive and maintain the resource.

Metadata should inform about: data structure, restrictions (if exist), what they mean and how they should be cited.

THERE ARE A FEW EXAMPLES OF METADATA FIELDS SUCH AS:

Dataset name	**Determination of the influence of green corrosion inhibitors on aluminium alloys in alkaline media**
Version	**1.0**
Author/s	**Ryl, Jacek; Wysocka, Joanna; Krakowiak, Stefan; Cieślik, Mateusz;**
Description	**The studies are devoted to search for green corrosion inhibitors of aluminium and its alloys, offering high corrosion inhibition efficiency in alkaline media. The project will aim at development of instantaneous impedance measurements for accurate determination of the adsorption isotherms.**
Format	**DTA**
Licence	**Creative Commons Attribution 4.0 International**
Funding Agency/ies	**Ministry of Science and Higher Education, Republic of Poland**
Keywords	**corrosion inhibitor, green chemistry, aluminium alloys, instantaneous impedance measurements**
DOI	***(all datasets deposited in Repository MOST DANYCH will receive unique DOI identifiers)***
Discipline	**Chemical sciences**
Language	**English**

There have appeared initiatives worldwide, formalising metadata specification to allow to reuse data easily, such as Research Data Alliance (RDA, **www.rd-alliance.org**), OpenAire (**www.openaire.eu**) and Metadata 2020 (**www.metadata2020.org**).

The aim of metadata standards is to systemise the type of the data description. Metadata prepared according to a standard have a stable description structure with explicitly defined fields, that is why, the description is understandable both for people and computers.

There are a lot of metadata standards, with distinguished general standards, domain and institutional standards. Dublin Core and Data Cite or Data Documentation Initiative (DDI) are general standards of metadata and are domain universal and widely used. Some of metadata standards are used in different disciplines and institutions such as: DC (life sciences) EML (ecology) SDMX (ECB, EUROSTAT, IMF, OECD, UN), SAFE (ESA), INSPIRE ISO 19139 (Earth Science), Project Open Data Metadata Schema v.1.1 (Federal Agencies USA) TEI and CDW (the humanities).

METADATA ARE ALSO THE DESCRIPTION OF VARIABLES, CODEBOOK AND CONTROLLED VOCABULARY INCLUDING:

- Names of variables (short and full forms, i.e. AGE and Age of the respondent);
- Units of measurement (i.e. mm);
- Allowed values (i.e. a range from 0 to 100);
- Variables definitions (i.e. Age=Age of the respondent in years).

ILLUSTRATIVE CONTROLLED VOCABULARY:

- Biology – Convention of Biological Diversity Controlled Vocabulary (CBDVoc);
- Economy and social sciences – Central Europe Glossary (CEG);
- Medicine – Unified Medical Dictionary (UMD);
- Education, social sciences – UNESCO thesaurus.

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DO YOU KNOW THAT...?

Metadata can be saved in: txt file, spreadsheets, XML file.

There are plenty of useful tools to create metadata such as:

Nesstar Publisher (www.nesstar.com) in line with DDI and Dublin Core standards, as well as tools like STATA, SPSS, and Eenvplus (www.eenvplus.sinergi.it/euosmegwt) and also Metadata Editor (www.edytor.geoportal.gov.pl) prepared to create metadata in the INSPIRE standard.

TO ARCHIVE AND MAKE RESEARCH DATA ACCESSIBLE

DMP should include a long-term strategy of storing, archiving and protecting research data. The aim of archiving data is to limit the costs of storing data and keeping them accessible. Open Research Data Repositories such as MOST DANYCH (The Bridge of Data) can serve as such archives. There can be found plenty of domain and institutional repositories via Web. Sometimes, it is required to deposit research data in a precise repository, by an organisation financing research. Sometimes it is allowed to choose the repository on your own.

To find the appropriate repository for your data, you can use the repository search engine i.e. RE3DATA (**www.re3data.org**). There are a few steps which should be followed before choosing the repository, such as:

- You should be familiar with the conditions of using the portal and check if it fulfils all requirements;
- It is good to know where and how your data will be stored and how they will be protected;
- Please be sure that the repository enables to allocate DOI to your datasets to fulfil the requirements of FAIR rules. . It is important to allocate the dataset with its authors by providing e.g. ORCID number. While choosing the repository it is worth checking if other scientists from your discipline use this repository;
- You should be familiar if the repository supports metadata standard used in your discipline;
- You should be aware that some of the repositories take a fee for archiving data –Data Processing Charge;
- The popularisation of scientific achievements is a very important aspect of the research activity, Please check if the chosen repository is indexed by databases such as Data Citation Index, Mendeley Data or Google Dataset Search.

The popularisation of scientific achievements is a very important aspect of the research activity, that is why it is important to be sure that the resources of a chosen repository are in data indexing databases such as Data Citation Index, Mendeley Data or Google Dataset Search.

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DO YOU KNOW THAT...?

Good practices of archiving data require the 3-2-1 Backup Rule – creating three backup copies, on two separate storage tools , one backup copy in a different physical location i.e. a different building or , a cloud'.

OPEN RESEARCH DATA - INITIATIVES

There are policies and rules related to making data accessible, storing and sharing data introduced by a lot of institutions related to science and research (like universities, research institutes, publishers and librarians). There is a list of exampled organisations helping to introduce FAIR rules, such as:

The Research Data Alliance (RDA) – the research community organisation which aim is to create a space for a discussion and development of the infrastructure needed for sharing data freely and doing researchbased on them, created in 2013 from the initiative of the European Commission, National Science Foundation (USA), National Institute of Standards and Technology and Department of Industry and Australian Innovation Department. The need of free flow of research data between institutions and scientists worldwide is the basic idea of RDA. Its functioning is based on Interest Groups focusing on various sharing aspects, the exchange and data interoperability in individual science disciplines. There are also the so-called Working Groups focusing mainly on solving specific problems via creating documents the so-called RDA Recommendations.

CODATA (Committee on Data for Science and Technology) is an international organisation located in Paris, founded in 1966 as one of ICSU several standing committees. CODATA statutory guidelines take into account: gathering, analysing and making accessible all kind of quantitative data resulting from experimental measurements and observations in disciplines such as physical, biological, geological and astronomic sciences. It focuses mainly on the problem of data managing, common for various disciplines, as well as on data used in different fields than those in which they were produced (inter alia data dissemination for needs of science and industry). 22 national representations and 18 representations of scientific unions take part in CODATA works. CODATA operates via Task Groups and Working Groups, two Permanent Commissions and (currently) one Special Group.

DCC – Digital Curation Centre, which aim is to build the potential and to develop the ability of research data managing. DCC ensures expert guidance and practical help to research organisations which want to store, manage, protect and make digital research data accessible. The aim of creating DCC was to manage actively digital material produced by scientists and researchers. At first, the project of building the centre mainly concerned the protection of digital resources with the use of the appropriate documentation system and protecting data. It was a reply to a huge amount of digital data generated by British scientists. Over time, international trainings and conferences aimed at supporting knowledge and the best practices between data producers and users transfer were added to its main activity.

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DO YOU KNOW THAT...?

Institutional policy in the field of Open Research Data was accepted by universities such as: Cambridge University, Manchester University and Melbourne University.

There are requirements of publishers too. See: Elsevier (Mendeley Repository and Elsevier Research Data) or Wiley Data Sharing Services.

RESEARCH DATA LICENSING

According to Reusable rule, data should have a license defining conditions of using a dataset. You should be aware of your institution policy about data accessibility before choosing the license. Moreover, the use of specified licenses may be required by agencies financing research. The use of ready-made (standard) licenses which allow to save time needed for creating a new, own type of license is a good and common practice. At the stage of creating DMP a license which will be used to make data accessible should be defined.

Creative Commons (CC) licenses are among open licenses and GNU General Public License Version 2 (GPLv2) and Massachusetts Institute of Technology (MIT license) are free software licenses.

Creative Commons is an international project, with a wide range of ready touse licenses established, leading to easier process of accessing data. There is a list of CC licenses in 4.0 version, which are in use currently, with a short description. It must be remembered that they were created for different items, not only for datasets, that is why you must be sure if a chosen license fits into your dataset.

Attribution - CC BY

It allows others to disseminate, change and create new items or sets based on licenced resources also commercially. Determining the authorship of such dataset is the requirement.

Attribution - ShareAlike - CC BY SA

Allows to copy, modify and disseminate a set under the condition that the authorship must be determined and dependent data dissemination on the same conditions.

Attribution - NoDerivatives - CC BY ND

Enables others to reuse data in any way under the condition that the authorship is recognised. However the license does not allow to modify the set.

Attribution - NonCommercial - CC BY NC

Allows other to copy, modify and disseminate the dataset for as long as the authorship is recognised and is used for non-commercial purposes.

Attribution - NonCommercial - ShareAlike - CC BY NC SA

Allows others to copy, modify and disseminate data under the condition that both original and modified datasets can be used non-commercially and can be disseminated with the same license.

Attribution - NonCommercial - NoDerivatives - CC BY NC ND

This CC license is the most restrictive one. It allows only to download a dataset and to share with others, under the condition that the authorship is recognised. The dataset cannot be modified or used commercially.

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DO YOU KNOW THAT...?

There have been created licenses aiming especially at licencing databases within Open Data Commons project, such as:

Public Domain Dedication License (PDDL) – a public domain for databases. It allows to download, share and modify databases unlimitedly.

Open Data Commons Attribution License (ODC-By) – a license with the only condition of recognising authorship to copy and modify databases.

Open Data Commons Open Database License (ODC-ODbL) – an open license allowing to copy, process and disseminate databases under the condition of recognising authorship and disseminating on the same conditions.

RESEARCH DATA POPULARISATION

Publication of a scientific article and sharing research data, e.g. through a repository, is not enough to disseminate the results of your research. Current technologies enable a number of activities to popularize scientific achievements. The possibilities include:

DATA JOURNALS

– peer-reviewed journals with articles about research data. There is a direct link to a resource, and include detailed theoretical assumptions, conditions, methods and parameters accompanying the process of creating data. There are interdisciplinary journals like "Scientific Data", "Data in Brief" as well as the ones focused on specific disciplines i.e. "Genomics Data";

SCIENTIFIC SOCIAL PORTALS I.E. RESEARCHGATE, ACADEMIA.EDU OR IMPACTSTORY

– these portals support the communication between scientists from the whole world. If the scientific profile is updated on the regular basis, the interest of publication and the use of available data can increase;

SOCIAL MEDIA

– you can use i.e. Twitter and update your profile to popularize your data. Twitter seems to be the fastest way of exchanging information.

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DO YOU KNOW THAT...?

Not only the traditional bibliometric indicators can be used to cite scientific publications but also alternative indicators – the so-called Altmetrics. They use the frequency of a publication or a dataset mentioning in social media or portals for scientists. To read more about Altmetrics, see https://www.altmetric.com

INSTITUTIONAL REPOSITORIES VS. SOCIAL MEDIA PORTALS

It should be remembered that social media portals for scientists support researchers in promoting research achievements, however they are not repositories or do not fulfil project`s assumptions related to making output of scientific research accessible.

	Institutional repository	Research Gate
Indexing (harvesting)	YES	NO (ACCIDENTAL)
Archiving (long-time preservation)	YES	NO
Archiving (long-time preservation)	NON PROFIT	COMMERCIAL
Does it fulfil the requirements of funding agencies and programmes such as NCN, Horizon 2020 or publishers	YES	NO

RESEARCH DATA CITATIONS

It is necessary not only to correctly cite the scientific publication, the content of which was used in your article, but also to cite the research data used in the publication (both generated data and shared by you and other scientists).

WHY IS CITATION OF RESEARCH DATA NEEDED?

- It has a positive impact on a scientist`s transparency and reliability,
- Datasets cited in related publications can have a positive impact on the number of these publications` citations,
- The appropriate citation of data enables and enhances to locate specific datasets,
- It helps to detect the plagiarism easier,
- Datasets citations in indexing databases (i.e. Data Citation Index, Index or Google Data Search) has a positive impact on a scientist`s performance.

The type of bibliographic description of a dataset depends mainly on the style of a chosen citation (i.e. APA, Chicago, IEEE) accepted in a publication. There are numerous styles of the citations, however the publisher usually requires to use one of them. The description should contain information such as: the author, year, title, place of accessibility such as: repository name, version, identifier, no matter which style will be chosen.

THE EXAMPLE OF APA CITATION STYLE:

Whitaker, K., Colavizza, G. (2019). Alan-turing-institute/das-public: First release with minor updates (Version v1.1) [Data set]. Zenodo. http://doi.org/10.5281/zenodo.3268810

THE EXAMPLE OF IEEE CITATION STYLE:

K. Whitaker and G. Colavizza. "Alan-turing-institute/das-public: First release with minor updates." (Version v1.1)" July 4, 2019. Distributed by Zenodo. http://doi.org/10.5281/zenodo.3268810

THE EXAMPLE OF AMA (AMERICAN MEDICAL ASSOCIATION) CITATION STYLE: **Whitaker K, Colavizza G. alan-turing-institute/das-public: First release with minor updates. July 2019. http://doi:10.5281/zenodo.3268810**

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DO YOU KNOW THAT...?

To create the bibliographic description of your dataset, which has already been given a DOI number, you can use Citation Formatter: https://citation.crosscite.org

Bridge of Data. Multidisciplinary Open Knowledge Transfer System - stage II: Open Research Data

The nature of the 'Bridge of Data' project is to design and build a platform that allows collecting, searching, analyzing and sharing open research data and to provide it with unique data collected from the three most important Pomeranian universities: Gdańsk University of Technology, Medical University of Gdańsk and the University of Gdańsk.

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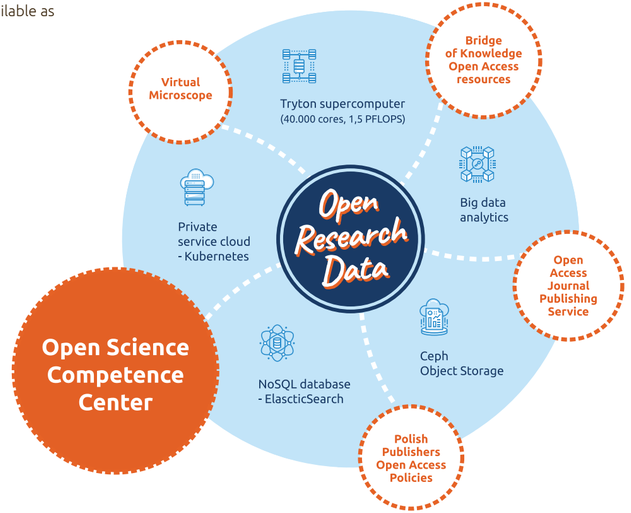
The Bridge of Data project at Gdansk University of Technology (GUT) will be available as the data repository with adjunctive services that are unique in Poland:

- Polish publishers copyright polices database
- Platform for university journals based on Online Journals System
- Software for conference organization
- Virtual microscope

Current developments put emphasis on research data and will provide technological innovations such as hosting the project on the private computing cloud and storing the data on the Cepch Object Storage. Searching the data will be available through open text search due to implementing the NoSQL database – ElasticSearch. Moreover, the project will allow researchers to perform Big Data Analysis by the Apache Zeppelin GUI on the supercomputer Tryton (40.000 cores, 1,5 PFLOPS).

The Open Science Competence Center offers guidance and support to researchers about publishing in an open access, preparing Data Management Plan, making data accessible in the research data repository, various trainings, consultancies, and other events promoting the idea of opening science.



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See more information at pg.edu.pl/openscience

"*Bridge of Data. Multidisciplinary Open Knowledge Transfer System - stage II: Open Research Data*" project is co-financed by the European Regional Development Fund under the Operational Program Digital Poland 2014-2020

European Funds Digital Poland

Republic of Poland

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European Union
European Regional Development Fund