DATA MANAGEMENT PLAN

# 1. Data description and collection or re-use of existing data

## How will new data be collected or produced and/or how will existing data be re-used?

The project will generate data including experimental numerical, textual, and graphic data. All data will

begeneratedand processed by qualified and trained person, taking advantage on their expertise and experience. The

datawill becollected by appropriate apparatus, software, and procedures depending on the type of analytical

techniqueused (e.g.IGC, FTIR, GC, Raman spectroscopy). Structure, type and units of the data will be detailed in a

README fileassociatedwith data-set. Existing data will only be used for purpose of comparison. It will be extracted

from literature,mainly scientific papers and available databases. It will not be a part of data-sets shared in open-access

repository.

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## What data (for example the types, formats, and volumes) will be collected or produced?

Most data files will not exceed 1024 KB. Three main types of the data will be generated: numerical data (records

ofmeasured output signal from detectors), textual data (instructions, procedures, reports etc.), graphic data (charts,

photographs, posters etc.). Most of the data will be processed on dedicated software attached to the analytical

instrument. The primary format for the data will be the native format of instrument software. To ensure accessibility

and interoperability of the data, it will be converted to ASCII type file if needed. No more than 100 GB of data is

anticipated to be collected during realisation of research project. Part of collected data will be textual and will be saved

as text, MS Word, pdf documents, graphic presentations. Numerical analog data will be captured in spreadsheets or

data tables and saved as .csv or .txt files.

# 2. Documentation and data quality

## What metadata and documentation (for example methodology or data collection and way of organising data) will accompany data?

Data acquisition equipment will be operated according to manufacturer’s manual, by qualified operator. For

experiments, procedures available in scientific literature or self-developed procedures will be used. Files and folders

will be named according to convention established by project’s researchers. Metadata (REDAME file) will be generated

to describe data-sets. Data may be accompanied by the contextual documentation e.g. text files which detail the

experimental procedures and conditions. Selected data will be facilitated by open research data repository (The Bridge

of Data from Gdańsk University of Technology, certified by Core Trust Seal) with metadata standards DataCite.

Metadata description will bestored in JSON format. Author will be identified and authorized by ORCID number.

## What data quality control measures will be used?

Data will be obtained by trained personnel using fully functional equipment (ensured by analysis of standard samples)

and accompanied by metadata file. For quantitative and qualitative analysis high quality standard materials and

procedures will be used. Experiments will be performed, at least, in duplicate. Technical problems with the data files

will be indicated by the instrument’s software and corrective actions will be taken. To ensure quality and

interoperability of the data, instrument native format will be converted to .txt or/and .csv. For reports and graphics

.pdf and .tiff or .png format will be preferred. Collected data will be controlled by researchers and if data will be invalid,

corrective actions will be performed according to established scientific standards. The data will be catalogued in a

standardized way fulfilling the requirements of FAIR standards

# 3. Storage and backup during the research process

## How will data and metadata be stored and backed up during the research process?

Data-sets will be stored in three locations: (1) memory of a computer that is a part of a given analytic alequipment, (2)

memory of a researcher’s computer (available space ca. 200 GB), and (3) Bridge of Data repository. Between

computers in the workplace, data will be transferred by external storage devices. Integrity and accessibility to the data

stored on the storage devices in the workplace will be checked periodically.

## How will data security and protection of sensitive data be taken care of during the research?

In the workplace, data-sets will be stored in the memory of password-secured computers. Computers that are

connected to the Internet will have installed antivirus software to prevent data being stolen. Data on external storage

devices will be stored in places under the control of project’s researchers that prevent unauthorized access by third

parties. Open acess data will be stored in the Bridge of Data repository, run by Gdansk University of Technology and

certified by Core Trust Seal.

# 4. Legal requirements, codes of conduct

## If personal data are processed, how will compliance with legislation on personal data and on data security be ensured?

Project research plan, objectives or task are not meant to process personal data other than the researchers basic data.

It will be used only for publication purpose if agreed by given researcher.

## How will other legal issues, such as intelectual property rights and ownership, be managed? What legislation is applicable?

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The ownership and management of any intellectual property developed in collaboration relating to the project remain

in the equal rights of the Gdansk University of Technology and researchers.

# 5. Data sharing and long-term preservation

## How and when will data be shared? Are there possible restrictions to data sharing or embargo reasons?

Project’s researchers will have unlimited access to the files created during this project. Data will be transferred

between researchers on memory storage devices or by email. To share data with third parties, data may be uploaded

to the open research data repository (The Bridge of Data from Gdańsk University of Technology). Each uploaded data-

set will beassigned with DOI number and will be shared as openly as possible (preferably open access). Data-sets may

be also submitted to supplementary materials sections of peer-reviewed journals. Data will be published when it will

be complete and processed. Moreover, data can beaccessed upon request via direct contact with the project PI.

Possible restrictions for data sharing: (1) patent application, (2) incomplete and not representative data, (3) collected

data maybe embargoed for up to 3 years to allow publication by students/researchers.

## How will data for preservation be selected, and where will data be preserved long-term (for example a data repository or archive)?

All original raw data files will be preserved along with reports in digital form and stored at PI computer (being a part of

the University infrastructure). The trusthworthy repository Bridge of Data from Gdansk University of Technology,

certified by Core Trust Seal, will be the main data repository for archivization of the data selected for long term

storage. The data provided in the repository will fulfill FAIR requirements and will be categorized and labeled

accordingto the standard file formats.

## What methods or software tools will be needed to access and use the data?

Access to selected data-sets will be provided by the open-access repository Bridge of Data (trustworthy repository from

Gdansk University of Technology certified by Core Trust Seal). Data sets published as a supporting information to peer-

reviewed publications will be accessible on a given journal website. Moreover data can be accessed upon request via

direct contact (e.g. email) with the project PI, if there is no restrictions for data-sets sharing. Research data will be

stored using commonly used file formats. For numerical data, e.g. signal from the detector, it will be .csv or .txt format.

Those files can be easily processed by any standard software used for scientific computations e.g. Mathlab, Scilab, R,

Excel. In case of graphic files .tiff or .png format will be preferred.

## How will the application of a unique and persistent identifier (such us a Digital Object Identifier (DOI)) to each data set be ensured?

Repository, to which selected data-sets will be uploaded, ensures that each data-set submission is assigned with the

DOI number. In case of data-sets being a part of publication in peer-reviewed journals (as a supporting information),

publisher is assigning the DOI number. If data-sets will be shared in any other way, they will be accompanied with

REDAME file, which will clearly identify content of data-sets.

# 6. Data management responsibilities and resources

## Who (for example role, position, and institution) will be responsible for data management (i.e the data steward)?

Open Science Competence Center (pg.edu.pl/openscience) established by the Gdansk University of Technology will be

responsible for DMP, data storage and dissemination. Project PI (Maksymilian Plata Gryl) will be responsible for the

procedures assessment and overall data quality.

## What resources (for example financial and time) will be dedicated to data management and ensuring the data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

No additional resources will be required to manage data. Storage and archiving of the data will be inseparable part of

the research project and data processing. Data will be stored in a trustworthy open access repositories Bridge of Data

(Gdansk University of Technology) certified by Core Trust Seal. For each submission a persistent DOI number will be

assigned, making the data-set traceable and referenceable. Data will be shared as openly as possible, in user-friendly

formats (e.g. .csv, .txt,.tiff, .png, .pdf) to maximize re-use.Maksymilian Plata Gryl, Politechnika Gdańska 651253