Multi-scale and multi-physics modelling of (un)disturbed cerebral autoregulation
Application DMP

Questionnaire

The questions in this section should only be answered if you are currently applying for FWO funding.
Are you preparing an application for funding?

- No

Multi-scale and multi-physics modelling of (un)disturbed cerebral autoregulation
DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

Question not answered.

Multi-scale and multi-physics modelling of (un)disturbed cerebral autoregulation
GDPR

GDPR

Have you registered personal data processing activities for this project?

Question not answered.

Multi-scale and multi-physics modelling of (un)disturbed cerebral autoregulation
FWO DMP (Flemish Standard DMP)

1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
		Please choose from the following options: • Generate new data • Reuse existing data	*Please choose from the following options:* • Digital • Physical	*Please choose from the following options:* • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	*Please choose from the following options:* • .por, .xml, .tab, .csv,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
MCA Dublin tissue samples	Tissue samples of donors	Reuse existing data	Physical				Not stored at KU Leuven
MCA Dublin experimental	Microscopy images of histological slices and raw data of mechanical tests	Generate new data (part of microscopy) Reuse existing data (part of microscopy, raw data of mechanical tests)	Digital	Experimental	.tif, .svs, .fig	<100GB	
MCA Dublin clinical data	Clinical data of tissue donors	Reuse existing data	Digital	Compiled data (excel file)	.xlsx	<100MB	
MCA Dublin processing	Matlab code, QuPath projects, read me's	Reuse existing data and generate new data	Digital	Software	.qpproj, .m, .txt	<1GB	
MCA Dublin processing results	Numerical output of processing	Generate new data	Digital	Simulation data	.mat, .xlsx	<100MB	
Myography tissue samples	Tissue samples of animals	Reuse existing data	Physical				Not stored
Myography experimental	Raw data of myography experiments	Generate new data	Digital	Experimental	.tif, .csv, .txt	<100GB	
Myography clinical data	Clinical data of animal	Reuse existing data	Digital	Compiled data (excel file)	.xlsx	<100MB	

Myography processing	Matlab code + read me's	Reuse existing data and generate new data	Digital	Software	.m, .txt	<1GB	
Myography processing results	Numerical output of processing	Generate new data	Digital	Simulation data	.mat, .xlsx	<100MB	
Autoregulation models	Matlab code + read me's	Reuse existing data and generate new data	Digital	Software	.m, .txt	<1GB	
Autoregulation model validation	Experimental outputs (blood flow, pressure, and vessel radius) and clinical data of animal	Reuse existing data	Digital	Compiled data (excel file)	.xlsx	<100MB	
Research output	All kinds of scientific output: papers, presentations, figures	Generate new data	Digital	Other	.tex, .docx, .pdf, .ppt, .tif, .png	<1GB	

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

Software: in case software is reused it is in house Matlab code developed by colleagues which will be adapted and extended where necessary. These codes are not publicly available.
Clinical data: excel files which summarize known general health and biometric parameters of tissue donors (patient or animal). These excel files already exist (MCA Dublin clinical data) or are being created (Myography clinical data + Autoregulation model validation) by the research group who is collecting the tissue samples. The research group responsible for the Myography clinical data + Autoregulation model validation is the group of my co-promotor (prof. Bart Depreitere). These excels are not publicly available.
Tissue samples: samples collected by either Trinity College Dublin or the group of my co-promotor (prof. Bart Depreitere).
Experimental outputs (Autoregulation model validation): experimental data generated by the group of my co-promotor (prof. Bart Depreitere). Although the raw experimental data is not publicly available, some of the data can be found in following paper: https://www.ahajournals.org/doi/full/10.1161/JAHA.121.022943.

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- No

In case of the experimental data ethical approval was already obtained by collaborating partners (MCA Dublin: Trinity College Dublin - prof. Caitríona Lally, other data: KU Leuven - prof. Bart Depreitere).

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes

The MCA Dublin clinical data refers to clinical data of human tissue donors. However, sensitive information such as patient name were removed from the excel files before these were received by the applicant.
cfr. https://admin.kuleuven.be/privacy/en/intranet/researchers

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- Yes

Data obtained in collaboration with Trinity College Dublin will not be redistributed without permission. However, they do support a co-authored publication on the results.

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- Yes

For reused matlab codes (in the context of the myography and the autoregulation model) the IP belongs to the KU Leuven Soft Tissue Biomechanics Group of promotor prof. Nele Famaey. The raw data of the myography experiments is IP of FIBEr (the lab in which prof. Nele Famaey is one of the principal investigators). Data obtained in collaboration with Trinity College Dublin will not be redistributed without permission.

2. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

1. Documentation from experiments
    - Test protocols: SOPs and specific protocols of the performed experiments.
    - Manuals: manuals for operating the testing devices, performing the scans, histology, etc.
    - Logbook and pictures of experiments.
2. Documentation from parameter optimization
    - Parameter fitting code is properly annotated and contains a readme-file to describe its content.
    - Version management of the scripts is done by Gitlab KU Leuven.
3. Data from simulations
    - All generated models are accompanied with a readme-file or contain a header to describe their content, author(s) and last modification date.
4. General computing code
    - All generated processing and analysis code is accompanied with a readme-file and contains a header to describe its content, author(s) and last modification date.
    - Version management of the scripts is done by Gitlab KU Leuven.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- Yes

1. Metadata from experiments

    - Data related to identification of the tested tissue/animal/patient. For biological samples, metadata is created upon registration at FIBEr (KU Leuven core facility for biomechanical experimentation), according to predefined fields. This metadata is safely stored in the FIBEr database. (The FIBEr database is accessible to FIBEr users; registration and KU Leuven login required.)
    - Specific protocol that was used to perform the mechanical test on a certain tissue. For our testing protocols, the FIBEr template is used, provided and reviewed by a member of the FIBEr team.
2. Metadata from parameter optimization
    - Resulting parameters are always accompanied by a report of the parameter fitting run, indicating settings of the parameter fitting code.
    - Any in-house developed code is properly annotated and accompanied by a readme-file.
3. Metadata from (Matlab) simulations
    - Any in-house developed code is properly annotated and accompanied by a readme-file, roughly according to the template found here: https://cornell.app.box.com/v/ReadmeTemplate

Furthermore the standards that are created within the Soft Tissue Biomechanics group & FIBEr will be followed.

3. Data storage & back-up during the research project

Where will the data be stored?

1. A NAS buffer storage for mechanical testing and data processing, located within FIBEr (KU Leuven Core Facility for Biomechanical Experimentation)
2. KU Leuven GitLab repository for code development
3. KU Leuven shared (One)drives and personal KU Leuven office (One)drive
4. KU Leuven archive drive for large data
5. Published data will be kept on KU Leuven RDR and coupled to ManGo
6. Physical data such as tissue samples will be discarded after testing
7. Histological slices of the MCA Dublin study will be stored at Trinity College Dublin

How will the data be backed up?

All data will be on KU Leuven's central servers which get backed up automatically on a daily basis.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely.
If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.

- Yes

KU Leuven OneDrive services and archive storage suffice to store the data.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

All data is securely stored on KU Leuven servers and only accessible by members of the research unit through authentication.

- FIBEr database is accessible to FIBEr users (registration and KU Leuven login required). Users have write-once rights (through the FIBEr uploader interface or the FIBEr apps webpage), data cannot be removed or modified except by the moderator.
- KU Leuven GitLab repository, shared (One)drives, and archive drive: read/write access is only given to the members of the Soft Tissue Biomechanics Group. This access is managed by promotor prof. Nele Famaey.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

KU Leuven charges a fixed price per TB on the different storage locations, whereby the average usage is charged on a yearly basis.

4. Data preservation after the end of the research project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

All datasets will be retained for 5 years after the end of the project (and for publications, until 5 years after the work has been published). Biological samples are destroyed after mechanical testing and can in any case not be retained due to preservation issues.

Where will these data be archived (stored and curated for the long-term)?

All data stored in the FIBEr database stays there for at least 5 years after the project/publication. All data in the KU Leuven drives and on GitLab will be moved to archival storage (KU Leuven's K-drive).

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

The costs will not exceed €500 and will be covered by the budget of the supervisor.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in an Open Access repository
- Yes, in a restricted access repository (after approval, institutional access only, …)

All datasets with the exception of the biological samples and histological slices are available for future use after publication. Scientific results will be accessible through scientific peer-reviewed journal papers with if relevant the protocols for mechanical testing as supplementary material. Matlab codes will be made available through GitLab.

If access is restricted, please specify who will be able to access the data and under what conditions.

Some of the Matlab code (e.g. parameter fitting code used for processing mechanical testing data) and raw data (all histological images, mechanical raw data) will be made available within KU Leuven and are only available to others upon request by mail. The scientific community will have access to the data under the following conditions of use: CC BY, in which appropriate credit must be given to the author and indication of changes must be made, and CC BY-NC, which adds a non-commercial term to the CC BY license.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.

- Yes, Intellectual Property Rights

The data related to the MCA study performed in Dublin can only be shared upon agreement of Trinity College Dublin (prof. CaiTríona Lally). However, they are in favor of publishing the results and making the used Matlab code available through GitLab.

For reused matlab codes (in the context of the myography and the autoregulation model) the IP belongs to the KU Leuven Soft Tissue Biomechanics Group of promotor prof. Nele Famaey.

Where will the data be made available? If already known, please provide a repository per dataset or data type.

Data will be made available within KU Leuven via the FIBEr database and the K-drive, via scientific papers and 'data papers' if supported by the journals, via data repositories, such as for example Zenodo, or other repositories upon request.

When will the data be made available?

Data will be made available after publication in peer-reviewed journals.

Which data usage licenses are you going to provide? If none, please explain why.

CC BY, in which appropriate credit must be given to the author and indication of changes must be made, and CC BY-NC, which adds a non-commercial term to the CC BY license.

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

Yes, a PID will be added upon deposit in a data repository

What are the expected costs for data sharing? How will these costs be covered?

Costs for open access publications can be up to €3000 per publication. Sharing large datasets via data repositories can also be costly. Costs for open access publications and possibly for data sharing via repositories (if not free in use) will be covered by the budget of the project.

6. Responsibilities

Who will manage data documentation and metadata during the research project?

Nele Demeersseman

Who will manage data storage and backup during the research project?

Nele Demeersseman

Who will manage data preservation and sharing?

Nele Demeersseman

Who will update and implement this DMP?

Nele Demeersseman