FWO DMP Template - Flemish Standard Data Management Plan

Project supervisors (from application round 2018 onwards) and fellows (from application round 2020 onwards) will, upon being awarded their project or fellowship, be invited to develop their answers to the data management related questions into a DMP. The FWO expects a **completed DMP no later than 6 months after the official start date** of the project or fellowship. The DMP should not be submitted to FWO but to the research co-ordination office of the host institute; FWO may request the DMP in a random check.

At the end of the project, the **final version of the DMP** has to be added to the final report of the project; this should be submitted to FWO by the supervisor-spokesperson through FWO's e-portal. This DMP may of course have been updated since its first version. The DMP is an element in the final evaluation of the project by the relevant expert panel. Both the DMP submitted within the first 6 months after the start date and the final DMP may use this template.

The DMP template used by the Research Foundation Flanders (FWO) corresponds with the Flemish Standard Data Management Plan. This Flemish Standard DMP was developed by the Flemish Research Data Network (FRDN) Task Force DMP which comprises representatives of all Flemish funders and research institutions. This is a standardized DMP template based on the previous FWO template that contains the core requirements for data management planning. To increase understanding and facilitate completion of the DMP, a standardized **glossary** of definitions and abbreviations is available via the following link.

1. General Project Information	
Name Grant Holder & ORCID	**Hongbo Yuan, 0000-0002-4250-195X**
Contributor name(s) (+ ORCID) & roles	
Project number[1] & title	98133, Smart hydrogels for optically mapping forces in 3D cancer models
Funder(s) GrantID[2]	Fonds voor Wetenschappelijk Onderzoek (FWO), 12A2423N
Affiliation(s)	☑ KU Leuven ☐ Universiteit Antwerpen ☐ Universiteit Gent ☐ Universiteit Hasselt ☐ Vrije Universiteit Brussel ☐ Other: Provide ROR[3] identifier when possible:
Please provide a short project description	In this project, I will develop mechano-responsive hydrogels combining PIC polymers with DNA-based force modules, which can optically report and control cellular forces and fiber remodeling process. By using fibroblasts and cancer cells as model cells, we will study the role of cellular forces and force propagation in fibroblast activation and cancer cell interactions. The methods and materials developed will allow researchers to study how cellular forces affect the matrix, how far do they propagate within the matrix, and how are forces transmitted from the matrix to the distant cell, with subcellular resolution, in 3D. The insights acquired will allow us to shed light on the role of fibroblast-induced mechanical cues in cancer propagation.

[1] "Project number" refers to the institutional project number. This question is optional since not every institution has an internal project number different from the GrantID. Applicants can only provide one project number.

[2] Funder(s) GrantID refers to the number of the DMP at the funder(s), here one can specify multiple GrantIDs if multiple funding sources were used.

[3] Research Organization Registry Community. https://ror.org/

2. 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[4].

				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
		☐ Generate new data ☐ Reuse existing data	☐ Digital ☐ Physical	☐ Observational ☐ Experimental ☐ Compiled/ aggregated data ☐ Simulation data ☐ Software ☐ Other ☐ NA	☐ .por ☐ .xml ☐ .tab ☐ .csv ☐ .pdf ☐ .txt ☐ .rtf ☐ .dwg ☐ .tab ☐ .gml ☐ other: ☐ NA	☐ < 100 MB ☐ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ < 10 TB ☐ < 50 TB ☐ > 50 TB ☐ NA	
Rheology measurement	Data from a rheometer (DHR-2, TA) will be used to address the mechanical	☒ Generate new data	☒ Digital	☒ Experimental	☐ other: Instrument-specific format .tri from DHR	☒ < 100 MB	

[4] Add rows for each dataset you want to describe.

	property of PIC-DNA gels.						
Microscopy measurement	Both bright and fluorescence images acquired from advanced microscopy to investigate cell morphology, immunostaining, the interactions between cell and smart PIC-DNA gels, and	☒ Generate new data	☒ Digital	☒ Observational	☒ other: Leica format .lif	☒ < 10 TB	
Biology assays	Data from biological assays like quantification of the extracellular expression by western blots, and qPCR, cell viability.	☒ Generate new data	☒ Digital	☒ Experimental	☒ .txt ☒ other: .jpg, .png, or .tif	☐ < 1 GB	
TFM calculation	Data generated from MATLAB-based TFMLab code to characterize the matrix displacement	☒ Generate new data	☒ Digital	☒ Simulation data	☒ other: .mat and .vtk format	☐ < 100 GB	

Guidance: *Data can be digital or physical (for example biobank, biological samples, …). Data type: Data are often grouped by type (observational, experimental etc.), format and/or collection/generation method.* *Examples of data types: observational (e.g. survey results, sensor readings, sensory observations); experimental (e.g. microscopy, spectroscopy, chromatograms, gene sequences); compiled/aggregated data[5] (e.g. text & data mining, derived variables, 3D modelling); simulation data (e.g. climate models); software, etc.* *Examples of data formats: tabular data (.por,. spss, structured text or mark-up file XML, .tab, .csv), textual data (.rtf, .xml, .txt), geospatial data (.dwg,. GML, ..), image data, audio data, video data, documentation & computational script.* *digital data volume: Please estimate the upper limit of the volume of the data per dataset or data type.* *physical volume: Please estimate the physical volume of the research materials (for example the number of relevant biological samples that need to be stored and preserved during the project and/or after).*	
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.	Not applicable
Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, please describe these issues further and refer to specific datasets or data types when appropriate.	☐ Yes, human subject data ☐ Yes, animal data ☐ Yes, dual use ☒ No If yes, please describe:

[5] These data are generated by combining multiple existing datasets.

Will you process personal data[6]? If so, briefly describe the kind of personal data you will use. Please refer to specific datasets or data types when appropriate. If available, add the reference to your file in your host institution's privacy register.	☐ Yes ☒ No If yes: - Short description of the kind of personal data that will be used: - Privacy Registry Reference:
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.	☐ Yes ☒ No If yes, please comment:
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 to what data they relate and what restrictions are in place.	☐ Yes ☒ No If yes, please explain:
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 to what data they relate and which restrictions will be asserted.	☐ Yes ☒ No If yes, please explain:

[6] See Glossary Flemish Standard Data Management Plan

3. 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. A README file will be provided for each dataset. 2. I will use a standard vocabulary for all data types present to allow inter-disciplinary interoperability, and explain the full term if it's the first using. 3. I will follow the framework of the biological standard. This standard makes sure that researchers provide the minimum information about genes and proteins in order to make them understandable by others. (For example: the MIFlowCyt standard in Flow Cytometry experiments.) 4. Some of my metadata are instrument specific. I will provide information about the instrument(s), such as brand name, serial number, year of manufacture. All metadata fields will be clearly labeled.
Will a metadata standard be used to make it easier to **find and reuse the data**? If so, please specify which metadata standard will be used. If not, please specify which metadata will be created to make the data easier to find and reuse. *Repositories could ask to deliver metadata in a certain format, with specified ontologies and vocabularies, i.e. standard lists with unique identifiers.*	☐ Yes ☒ No If yes, please specify (where appropriate per dataset or data type) which metadata standard will be used: If no, please specify (where appropriate per dataset or data type) which metadata will be created: Metadata to the datasets are created automatically by the **Rheometer** or **Confocal microscopy**. I will provide information about the instrument(s), such as brand name, serial number, year of manufacture. All metadata fields will be clearly labeled.

4. Data Storage & Back-up during the Research Project	
Where will the data be stored?	In the short-term, the research group will invest in the procurement of portable hard drive devices for regular storage and backup. Also, the data will be stored in the central storage facilities of the research unit. In a long term, the data will be stored on the university's central servers for at least 5 years after the end of the project, conforming to the RDM policy of KU Leuven.
How will the data be backed up? *What storage and backup procedures will be in place to prevent data loss? Describe the locations, storage media and procedures that will be used for storing and backing up digital and non-digital data during research.*[7] *Refer to institution-specific policies regarding backup procedures when appropriate.*	We will use the central server storage of KU Leuven, which provides a self-mirrored daily automatic back up. In addition, a back-up will be stored in the portable hard drive devices provided by the research group, and in the cloud drive of the instrument devices.
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 ☐ No If yes, please specify concisely: The research unit has already invested in short-term and mid-term procuring storage devices and space for data. If no, please specify:

[7] Source: Ghent University Generic DMP Evaluation Rubric: https://osf.io/2z5g3/

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons? *Clearly describe the measures (in terms of physical security, network security, and security of computer systems and files) that will be taken to ensure that stored and transferred data are safe.* [7]	The KU Leuven network drives are incorporated within secured KU Leuven environments, are password-protected (including smartphone-based multi-factor identification) and are only accessible by registered collaborating researchers. Only the PI can request access to the network drive for study personnel. In addition, the data security is ensured by the dedicated service team at the institution, where the KU Leuven university data center has been built and operated at a very high security level with self-mirrored automatic backup at different physical locations. All data is transfered via encrypted methods.
What are the expected costs for data storage and backup during the research project? How will these costs be covered?	

5. 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 data will be retained for the expected 5-year period after the end of the project.

Where will these data be archived (stored and curated for the long-term)?	The data will be stored on the university's central servers (with automatic back-up procedures) for at least 5 years after the end of project, conform the KU Leuven RDM policy.
What are the expected costs for data preservation during the expected retention period? How will these costs be covered?	The research unit has already invested in short-term and mid-term procuring storage devices and space for data. For long-term data storage till 5 years after the end of the project, we will use the service provided by the institution, which costs approx. 700 Euros yearly, which requests about 3500 Euros for support from the grant.

6. Data Sharing and Reuse	
Will the data (or part of the data) be made available for reuse after/during the project? Please explain per dataset or data type which data will be made available. *Note that 'available' does not necessarily mean that the data set becomes openly available, conditions for access and use may apply. Availability in this question thus entails both open & restricted access. For more information: https://wiki.surfnet.nl/display/standards/info-eu-repo/#infoeurepo-AccessRights*	☒ Yes, in an Open Access repository After the end of project, the data produced in this project will be made usable by third parties via open-access publications and shared depository of relevant data upon requests. ☐ Yes, in a restricted access repository (after approval, institutional access only, …) ☐ No (closed access) ☐ Other, please specify:
If access is restricted, please specify who will be able to access the data and under what conditions.	
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 per dataset or data type where appropriate.	☐ Yes, privacy aspects ☐ Yes, intellectual property rights ☐ Yes, ethical aspects ☐ Yes, aspects of dual use ☐ Yes, other ☒ No If yes, please specify:
Where will the data be made available? If already known, please provide a repository per dataset or data type.	We will deposit the data in our institutional repository, eg. Lirias: https://lirias2.kuleuven.be/default.html

When will the data be made available? *This could be a specific date (dd/mm/yyyy) or an indication such as 'upon publication of research results'.*	Upon publication of the research results
Which data usage licenses are you going to provide? If none, please explain why. *A data usage license indicates whether the data can be reused or not and under what conditions. If no licence is granted, the data are in a grey zone and cannot be legally reused. Do note that you may only release data under a licence chosen by yourself if it does not already fall under another licence that might prohibit that.* *Example Answer: E.g. "Data from the project that can be shared will be made available under a Creative Commons Attribution license (CC-BY 4.0), so that users have to give credit to the original data creators."* [8]	Data from the project that can be shared will be made available under a creative commons attribution license (cc-by 4.0), so that users have to give credit to the original data creators.
Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, please provide it here. *Indicate whether you intend to add a persistent and unique identifier in order to identify and retrieve the data.*	☒ Yes ☐ No If yes: A DOI will be available through RDR, but is not yet available.
What are the expected costs for data sharing? How will these costs be covered?	RDR is free for KU Leuven personnel, hence, no costs are expected for data sharing.

[8] Source: Ghent University Generic DMP Evaluation Rubric: https://osf.io/2z5g3/

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	The grant holder (Hongbo Yuan) will be responsible for data documentation & metadata, under supervision of the PI (Susana Rocha).
Who will manage data storage and backup during the research project?	Data management, storage and back up will be performed by the grant holder (Hongbo Yuan), under supervision of the PI (Susana Rocha).
Who will manage data preservation and sharing?	The PI (Susana Rocha) will be responsible for ensuring data preservation and sharing.
Who will update and implement this DMP?	The grant holder (Hongbo Yuan) will be responsible for updating this DMP. The PI (Susana Rocha) bears the end responsibility for updating and implementing this DMP.