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	**Tanmay Sinha 0000-0002-1177-0831**
Contributor name(s) (+ ORCID) & roles	**Francisco Molina-Lopez 0000-0002-4329-4059, Promotor**
Project number[1] & title	**1160623N- Inkjet Printing of a Photosupercapacitor for Indoor Light Energy Harvesting and Storage on a Smart Contact Lens**
Funder(s) GrantID[2]	
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	Efficient energy management systems can enable the development of smart contact lenses that can regulate vision and measure physiological signals. Current operational batteries are too bulky to be comfortable for the user and thus to be used for such an application. Therefore, an alternative in the form of photosupercapacitors is proposed, integrating an energy harvesting part (organic photovoltaic cell) and an energy storage part (micro-supercapacitor). The system is expected to provide sufficient power (~0.18mW) for the operation of microelectronic devices. To achieve the fabrication of such a system, the technique of inkjet printing (IJP) will be used, leveraging its advantages of high patterning accuracy and low cost. At a fundamental level, it is expected to shed light on the relationship between the morphology of the IJP active layer of the device and its performance, enabling fine-tuning of the manufacturing process for device optimisation.

[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.

				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	Physical Volume
Inkjet Printing	Images	New	Digital	Experimental	.jpeg	50 GB	
Synchrotron Experiments	GIWAXS/GISAXS Data	New	Digital	Experimental	.txt and dubble	100 GB	
Surface Tension Measurements	Drop and Surface Analyser Data	New	Digital	Experimental	.jpeg and .txt	10 GB	
Microscopy Images	Optical Microscope, SEM, TEM	New	Digital	Experimental	.tif	100 GB	
Thickness measurement	Thickness and profile by AFM	New	Digital	Experimental	Nid	100 GB	
UV-VIS	Chemical composition by UV-VIS	New	Digital	Experimental	.txt	10 GB	
Mechanical analysis	Dynamic Mechanical Analysis and bending tests	New	Digital	Experimental	.zdat and .txt or .xls	10 GB	
Electrical measurements	By EIS or LCR meter	New	Digital	Experimental	.txt	10 GB	
Viscosity	Ubbelohde viscometer	New	Digital	Experimental	.pdf	1 GB	
Lab Notes	In notebooks	New	Physical	-	-	-	Notebooks maintained by me
Scripts for data analysis	(Matlab) scripts for data analysis	New	Digital	Software	.m	10 GB	
Samples	Experiment samples	New and Reused	Physical				Storage cabinet in chemical Lab, MTM

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:
Will you process personal data[4]? 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:

[4] See Glossary Flemish Standard Data Management Plan

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:

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).	Our research group is participating in a KULeuven pilot program with the iRODS consortium, which allows researchers to find, access, share, and reuse data more effectively based on metadata. The metadata that will be used to identify data has been described in the next section. All kinds of data (experimental raw data, processed data, literature review reports and presentations related to work progress and conferences) will be stored on iRODS, where it will be accessible to my supervisor and colleagues. The data will also be stored on the KU Leuven personal drive, and can be provided to interested parties upon request. Standard Operating Procedures (SOPs) maintained in this way (with physical copies available in labs) are used by the entire group for the operation of common equipment.

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:
We use the following template for iRODS:

Collection: Experimental_raw_data				
User	*Project*	*Instrument*		*Date_experiment*
FML <- Francisco	ERC-3DALIGN	LFA	IMG <- Images/pictures	dd/mm/yyyy
YT <- Yuan tian	FWO-PhD <- Yuan	LSR	SLM <- Selective laser print	
HEB <-Hasan	FWO-OPV	DMC <- Keyence	XRD_D2 <- XRD D2	
BZ <-Bokai	FLOF-OPV <- Tanmay	ELI <- Ellipsometer	XRD_D8	
TYC <- Jean	MXene	CONF <- Sensofar confocal	(GI)WAXS	
TYY <- Thomas	C1-ITE <- Isidro	AFM	UV-Vis	
VN <- Viktor Naenen	IDN-OTE	SEM	Raman	
TS <- Tanmay Sinha	EOS-Weyl <- Heyi	EDS	DASA_ST <- Surface tension	
IFC <- Isidro Florenciano Cano		TEM	DASA_CA <- Contact angle	
HX <- Heyi Xia		ICP-OES	TGA	
		WDXRF	DSC	
Values		Microscope	Rheo <- Rheometer MTM or ChemEng	
		MM <- Multimeter	Potentiostat	
		SMU <- Source/meter units	3DP <- Code/layout extrusion 3D printer	
		IP <- Inkjet printer	SBK <- Seebeck (home setup V1)	
Collection: Processed_data				
User	*Project*	*Type*		*Date*
FML <- Francisco	ERC-3DALIGN	Presentation		dd/mm/yyyy
YT <- Yuan tian	FWO-PhD	Figure		
HEB <-Hasan	FWO-OPV	Report		
BZ <-Bokai	FLOF-OPV	Paper		
TYC <- Jean	MXene	Code		
TYY <- Thomas	IDN-OTE			
VN <- Viktor Naenen	EOS-Weyl <- Heyi			
TS <- Tanmay Sinha				
Collection: Research				
User	*Project*	*Type*		*Date*
FML <- Francisco	ERC-3DALIGN	Literature		dd/mm/yyyy
YT <- Yuan tian	FWO-PhD	SOP		
HEB <-Hasan	FWO-OPV	Material		
BZ <-Bokai	FLOF-OPV	Equipment		
TYC <- Jean	MXene	Method		
TYY <- Thomas	IDN-OTE	Proposal		
VN <- Viktor Naenen	EOS-Weyl <- Heyi	Presentation		
TS <- Tanmay Sinha	NA <- Not applies	Report		

4. Data Storage & Back-up during the Research Project	
Where will the data be stored?	iRODS and KU Leuven personal drive, notes in notebooks personally maintained (transferred to digital reports and presentations every now and then).
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.*[5] *Refer to institution-specific policies regarding backup procedures when appropriate.*	All measurement data will be stored on the KULeuven personal drive and kept on the measurement equipment/PC where possible. All crucial information will also be stored on iRODS. Physical samples are stored in sample boxes in the lab/departmental storage room.
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 estimated storage and backup capacity (<300 GB) is available.
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]	Both on the KULeuven personal drive and on iRODS there are strict authorizations in place so no external/unauthorized user can access the data. Each KULeuven-associated PC requires username and password, which must be changed every year.

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

What are the expected costs for data storage and backup during the research project? How will these costs be covered?	My research group has a minor cost of 30 EUR per year for 2 TB storage in iRODS

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 of section 2 will be retained for the expected 5 years 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 10 years, 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 data will be stored on the university's central servers for at least 10 years for free. Extra generated costs will be afforded by the research group.

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 ☒ Yes, in a restricted access repository (after approval, institutional access only, …) The full dataset (except for some unpublished SOPs and other know-how-related files) will be uploaded in Zenodo or the Open Science Framework (for KU Leuven community) under a CC-BY license. ☐ No (closed access) ☐ Other, please specify:
If access is restricted, please specify who will be able to access the data and under what conditions.	The full dataset will be transferred to my supervisor and will be stored on the university's central servers. He or the future students could reuse the data with the approval from my PhD supervisor and me. The valuable data will be written into research papers. The paper-related information could be shared upon request by mail.
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.	Not already known

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 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." [6]*	The full dataset (except for some unpublished SOPs and other know-how-related files) will be uploaded in Zenodo or the Open Science Framework (for KU Leuven community) under a CC-BY-NC license
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:
What are the expected costs for data sharing? How will these costs be covered?	The data sharing through university server is free. The data shared through publication will be charged a fee. The fee will be covered by the FWO bench fee.

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

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	**Day-to-day data management: Tanmay Sinha** **Overall data management, in the long term and after completion of the project: Francisco Molina-Lopez**
Who will manage data storage and backup during the research project?	**Day-to-day data management: Tanmay Sinha** **Overall data management, in the long term and after completion of the project: Francisco Molina-Lopez** **Tanmay Sinha is in charge of data back-up on the university server (shared drive and iRODS)**
Who will manage data preservation and sharing?	**Day-to-day data management: Tanmay Sinha** **Overall data management, in the long term and after completion of the project: Francisco Molina-Lopez**
Who will update and implement this DMP?	**Tanmay Sinha (with support from Francisco Molina-Lopez)**