FWO DMP Template - Flemish Standard Data Management Plan

Version KU Leuven

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	**Elise Van Vlierberghe (https://orcid.org/0000-0002-6005-3310)**
Contributor name(s) (+ ORCID) & roles	**Yentl Swolfs (https://orcid.org/0000-0001-7278-3022), supervisor**
Project number [1] & title	1S31625N, Delaying off-axis cracking in composite plies with a conventional thickness (DELICATE)
Funder(s) GrantID [2]	FWO (1S31625N)
Affiliation(s)	KU Leuven ROR identifier KU Leuven: 05f950310
Please provide a short project description	Off-axis cracks are often the first damage in fibre-reinforced polymer composites. They trigger other damage types and decrease mechanical performance. Unfortunately, our understanding is too limited to predict or delay off-axis cracks accurately due to: 1) difficulties in reliably characterising the fibre, matrix, and interface properties, 2) a lack of reliable, validated models, 3) challenges in experimental identification of the crack initiation and propagation in 3D. This fellowship will address these three limitations. I will measure in-situ constituent properties at the microscale. These properties serve as vital input parameters for the computational model that I will develop. This 3D model will predict not only the initiation but also the propagation of the off-axis cracks along the fibre direction. This will enable me to assess the key constituent properties and microstructural features that can be adjusted to delay off-axis cracks. I will validate the model based on the crack density evolution as well as the damage micromechanisms observed via in-situ synchrotron computed tomography. I believe a delay in off-axis crack initiation by a factor of 2 is realistic, by selecting the right constituents and microstructure. This would enable significant reductions in safety factors for composite structures through small, easy-to-implement changes, and help unlocking the full lightweight and sustainability potential of composites.

[1] "Project number" refers to the institutional project number. This question is optional. 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.

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 [3].

				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
X-ray computed tomography volumes	Reconstructed CT slices of in-situ scans from composites specimens during loading	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Audiovisual ☒ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:	.tif	☐ < 1 GB ☐ < 100 GB ☒ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	
Synchrotron experiments	In-situ scans from loaded composites: radiographs + reconstructed SRCT volumes	☒ Generate new data	☒ Digital	☒ Images	.tif	☒ > 5 TB	
Digital image correlation (DIC) maps	DIC is applied to the in-situ images and the results will be saved as datasets	☒ Generate new data	☒ Digital	☒ Numerical ☒ Model	.csv .am	☒ < 5 TB	
Microscopy Images	Optical Microscope + SEM	☒ Generate new data	☒ Digital ☐ Physical	☒ Images	.tif	☒ < 100 GB	

Mechanical analysis	Load curves of tensile tests + cross-section measurements + nano-indentation	☒ Generate new data	☒ Digital	☒ Numerical	.txt .mat	☒ < 100 GB	
TGA and DSC	Phase characterisation	☒ Generate new data	☒ Digital	☒ Numerical	.txt	☒ < 1 GB	
FEM models for sensitivity analysis	Abaqus	☒ Generate new data ☒ Reuse existing data	☒ Digital	☒ Model ☒ Software	.cae .inp .odb .py .m	☒ < 100 GB	
Lab notes	In notebooks	☒ Generate new data	☒ Physical				Office, MTM
Scripts for data analysis	(Matlab) scripts for data analysis	☒ Generate new data	☒ Digital	☒ Software	.mlx	☒ < 100 GB	
Samples	Experiment samples	☒ Generate new data ☒ Reuse existing data	☒ Physical				Storage room, MTM

GUIDANCE:
The data description forms the basis of your entire DMP, so make sure it is detailed and complete. It includes digital and physical data and encompasses the whole spectrum ranging from raw data to processed and analysed data including analysis scripts and code. Physical data are all materials that need proper management because they are valuable, difficult to replace and/or ethical issues are associated. Materials that are not considered data in an RDM context include your own manuscripts, theses and presentations; documentation is an integral part of your datasets and should described under documentation/metadata.
RDM Guidance on data

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

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.	NA
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, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.	☐ Yes, human subject data; provide SMEC or EC approval number: ☐ Yes, animal data; provide ECD reference number: ☒ Yes, dual use; provide approval number: E-2024-5138 ☐ No Additional information: The study deals with carbon-fiber composites, which are considered dual-use materials. However, the project has received a **positive advice** from the Ethical committee on Dual use, Military use & Misuse (EC DMM) of KU Leuven.
Will you process personal data[4]? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).	☐ Yes (provide PRET G-number or EC S-number below) ☒ No Additional information:
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:

[4] See Glossary Flemish Standard Data Management Plan

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). *RDM guidance on documentation and metadata*.	For all experimental data the following information is gathered and saved: the experimental set-up, sample name, sample dimensions, time of experiment, load level. All software-related data is provided with annotation for each command. The data is stored in hierarchical structures on the network-attached storage (NAS) available in my group.
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: The devices in our lab generate standard metadata with the generated results. For the experimental data extracted in CSV files it is included, while for the image-based data it comes in a separate text file. If no, please specify (where appropriate per dataset or data type) which metadata will be created:

4. Data Storage & Back-up during the Research Project	
Where will the data be stored? *Consult the interactive KU Leuven storage guide to find the most suitable storage solution for your data.*	☐ Shared network drive (J-drive) ☒ Personal network drive (I-drive) ☒ Teams ☐ Sharepoint online ☐ Sharepoint on-premis ☐ Large Volume Storage ☐ ManGO ☐ Digital vault ☒ Other: All the data will be stored on a few HDDs and backed up on our NAS system.
How will the data be backed up? *WHAT STORAGE AND BACKUP PROCEDURES WILL BE IN PLACE TO PREVENT DATA LOSS?*	☐ Standard back-up provided by KU Leuven ICTS for my storage solution ☐ Personal back-ups I make (specify) ☒ Other (specify) Besides backing up the full data on our NAS system, I will back up a selection of the useful data on OneDrive. Experimental measurements are kept on the equipment/PC where possible.
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: We have enough space on our NAS for the mentioned data. Moreover, my personal OneDrive has 250 GB of available space for the backup of the selected data. 1-2 extra external HDDs will be purchased.

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.* *Guidance on security for research data*	Our data is not highly sensitive. Anyway, access to our NAS is limited to a few people in the group. The selected data on OneDrive is only accessible by me. Each KULeuven-associated PC requires username and password, which must be changed every year.
What are the expected costs for data storage and backup during the research project? How will these costs be covered?	Since we do not see any need for extra storage at the moment, we do not anticipate any costs. Just, 1-2 external HDDs will be purchased, which are inexpensive and can be purchased from the project bench fee.

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...). *Guidance on data preservation*	☒ All data will be preserved for 10 years according to KU Leuven RDM policy ☐ All data will be preserved for 25 years according to CTC recommendations for clinical trials with medicinal products for human use and for clinical experiments on humans ☐ Certain data cannot be kept for 10 years (explain)

Where will these data be archived (stored and curated for the long-term)? *Dedicated data repositories are often the best place to preserve your data. Data not suitable for preservation in a repository can be stored using a KU Leuven storage solution, consult the interactive KU Leuven storage guide.*	☐ KU Leuven RDR ☐ Large Volume Storage (longterm for large volumes) ☐ Shared network drive (J-drive) ☒ Other (specifiy): NAS
What are the expected costs for data preservation during the expected retention period? How will these costs be covered?	Since we do not see any need for extra storage at the moment, we do not anticipate any costs.

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, as open data ☐ Yes, as embargoed data (temporary restriction) ☐ Yes, as restricted data (upon approval, or 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.	☐ KU Leuven RDR ☐ Other data repository (specify) ☒ Other (specify): Not already known
When will the data be made available?	☒ Upon publication of research results ☐ Specific date (specify) ☐ Other (specify)
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.* *Check the RDR guidance on licences for data and software sources code or consult the License selector tool to help you choose.*	☐ CC-BY 4.0 (data) ☐ Data Transfer Agreement (restricted data) ☐ MIT licence (code) ☐ GNU GPL-3.0 (code) ☒ Other (specify): Data in Brief articles are open access. Therefore, the data will be accessible for public.

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, a PID will be added upon deposit in a data repository ☐ My dataset already has a PID ☐ No
What are the expected costs for data sharing? How will these costs be covered?	Data in Brief publication has a cost of 700 USD, which will be paid from the project bench fee.

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	Elise Van Vlierberghe
Who will manage data storage and backup during the research project?	Elise Van Vlierberghe
Who will manage data preservation and sharing?	Yentl Swolfs
Who will update and implement this DMP?	Elise Van Vlierberghe – The PI (Prof. Yentl Swolfs) bears the end responsibility of updating & implementing this DMP.