FWO DMP Template

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.

1. General Information	
Name applicant	**Stijn Van Cleuvenbergen**
FWO Project Number & Title	RADIUS RAtional DesIgn of nUcleating Surfaces
Affiliation	☒ KU Leuven ☐ Universiteit Antwerpen ☐ Universiteit Gent ☐ Universiteit Hasselt ☐ Vrije Universiteit Brussel ☐ Other:
2. Data description	
Will you generate/collect new data and/or make use of existing data?	☒ Generate new data ☐ Reuse existing data

Describe the origin, type and format of the data (per dataset) and its (estimated) volume *If you **reuse** existing data, specify the **source** of these data.* *Distinguish data **types** (the kind of content) from data **formats** (the technical format).*	The research will generate data as material samples via crystallization. These materials will be in the form of solutions or crystals and powders, both in dry form, in suspension and on functionalized surfaces (eg glass slides). The samples will be stored in sealed glass or plastic recipients. The preparation procedures and the researcher's experimental observations will be noted in laboratory notebooks, generating analog data. Analog lab data will be copied in an electronic lab-book (ResearchSpace) with appropriate reference to the material samples. For comparison reasons and referencing, existing data may be used. This data can be both as materials previously synthesized/prepared or as information (eg. absorption and emission spectra, PXRD patterns, etc.) shared in scientific publications or specific databases (eg. The Cambridge Structural Database). Experimental data will be collected for material characterization, in a variety of file formats (see bellow). Multiple data files will be generated, organized in a well-defined structured folder with analysis results and detailed statistical analyses. All the digital files will cointain the specific abbreviation of the analyzed sample in the name (eg. ABXX, where AB are the initials of the researcher that prepared the sample and XX is the number of the page of the laboratory notebook in which the sample's preparation procedure is written). Below, the list the file types for the raw data, processed/analyzed data and final data (published).

We estimate a total data size of 1Tb for the entire project.

Setup that generates the data	File type - Raw data	Contains metadata?	File type - Analysis	Contains metadata?	File type publication
SHG microscopy	AIST, TXT, LSF	yes	TIFF, BMP, JPG	yes	TIFF, PPT, PDF,BMP
Wide-field SHG microscopy	ASC, SIF	yes	MAT, ORG	yes	PDF, PPT, TIFF, JPG, PSD, PNG
SEM microscopy	TIF, TXT	yes	BMP, XLSX	yes	PDF, JPG, PNG
EDS	BMP, EMF, TXT	yes	PDF	no	PDF, JPG
XRD diffraction	TXT, Rigaku RAW, DAT, Diffrac Plus Raw	yes	TXT, DAT	yes	TXT, PPT, PDF
optical absorption and emission spectroscopy	ASC, SP, FS, TXT, XLSX, SP, RSC, OPJ	yes	TXT, SP, OPJ, XLSX	yes	PDF, PPT, TIFF, JPG, PSD, PNG, DOCX
piezo-response force microscopy	STP, MP, IBW, TXT	yes	TIFF, BMP, JPG	yes	TIFF, PPT, BMP, PDF
Hyper-Rayleigh scattering	TXT	yes	OPJ, TXT	yes (metadata via additional file)	JPG, TIFF, BMP, PNG, DOCX

3. Ethical and legal issues	
Will you use personal data? If so, shortly describe the kind of personal data you will use AND add the reference to your file in your host institution's privacy register. *In case your host institution does not (yet) have a privacy register, a reference is not yet required of course; please add the reference once the privacy register is in place in your host institution.*	☐ Yes ☒ No If yes: - Privacy Registry Reference: - Short description of the kind of personal data that will be used:
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, add the reference to the formal approval by the relevant ethical review committee(s).	☐ Yes ☒ No If yes: - Reference to ethical committee approval:
Does your work possibly result in research data with potential for tech transfer and valorisation? Will IP restrictions be claimed for the data you created? If so, for what data and which restrictions will be asserted?	☒ Yes ☐ No If yes, please comment: The generated data restriction is in accordance with the framework policy of the university. When potential data and results that can lead to tech transfer and valorisation are collected, LRD will be consulted for support and advice.
Do existing 3rd party agreements restrict dissemination or exploitation of the data you (re)use? If so, to what data do they relate and what restrictions are in place?	☐ Yes ☒ No If yes, please comment:

4. Documentation and metadata

What documentation will be provided to enable understanding and reuse of the data collected/generated in this project?	In order to make sure all the data collected and stored will be reliable and reproducible, a text document describing the exact experimental conditions, including date, time, location of measurements, instruments, sample preparation protocol and measurement parameters etc. This file will be kept in the same folder where the data is stored. In addition, data will be stored in a folder per experimental setup, the type of investigated system and the corresponding date. The names of the files will be structured in a comprehensible way. The name of each file will contain the specific abbreviation of the analyzed sample in the name (eg. GRXX, see section 2). In this way, by tracking the corresponding logbook/lab-book notes, each file can be easily found on the local computers controlling the setup and on the server of the laboratory. For the materials, a list of samples and the location where these are stored will be kept in researcher's logbook. A description of the sample's characteristics (e.g. sample name, solvent, quantity, date, concentration) will be added to allow rapid identification and reuse.
Will a metadata standard be used? If so, describe in detail which standard will be used. If not, state in detail which metadata will be created to make the data easy/easier to find and reuse.	☐ Yes ☒ No There is no formal metadata standard. However, the standardized steps described in section 4.1 will ensure that the data is easy to find and reuse.

5. Data storage & backup during the FWO project

Where will the data be stored?	Data will be firstly collected and kept at the local desktops of the instruments. For analysis purposes some data will also be copied on the researcher's computer and personal storages such as portable hard disks. In any case, a backup copy of the raw data will be automatically made on the servers of ICTS - Standard. The data will be also backed-up in a secure server space in KULAK. All the data will also be organized and saved in the researcher's personal cloud backup storage (2TB) provided by KU Leuven. For the materials, the recipients containing samples will be sealed, labelled and stored in a cabinet for chemicals. Samples containing materials sensitive to environment (perovskites) will be stored in inert atmosphere or under dry nonsolvent to avoid degradation. Since perovskites are also sensitive to light, they will be stored in dark recipients to avoid contact with light. Laboratory notebooks will be stored in the office C754 at the Kulak campus. The content of the lab-notebook will be copied in electronic lab-books with appropriate reference to the obtained data. The electronic lab-book will be stored in a cloud service according to the GDPR of EU. The data will be backed-up in a secure server space in KULAK
How will the data be backed up?	The data will be mirror stored on the university's central servers (large volume storage at ICTS) with automatic daily back-up procedures. The produced materials will be stored for at least one year. After that time, only the samples that do not undergo degradation (not useful anymore) or of particular relevance will be stored.
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 no, please specify: The amount of data that will be generated in this project should not exceed a few hundreds GBs, which is small enough to be stored in local computers and on the data server of the laboratory. The amount of space in the cabinet used as a storage for samples is currently sufficient.

What are the expected costs for data storage and backup during the project? How will these costs be covered? *Although FWO has no earmarked budget at its disposal to support correct research data management, FWO allows for part of the allocated project budget to be used to cover the cost incurred.*	The costs for digital data storage and back up are covered by the promotor. The costs for eventual extra chemical storage cabinets will be covered by the promotor.
Data security: how will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?	The identifiable data files from this project will be managed, processed, and stored in a secure environment. The data transfer with the ICTS - Standard Storage Solutions provided by KU Leuven is done over an encrypted connection. The data is encrypted with a 256-bit SSL. The place where the materials are stored is only open to the IRF members via badge access.

6. Data preservation after the end of the FWO project FWO expects that data generated during the project are retained for a period of minimally 5 years after the end of the project, in as far as legal and contractual agreements allow.	
Which data will be retained for the expected 5 year period after the end of the project? In case only a selection of the data can/will be preserved, clearly state the reasons for this (legal or contractual restrictions, physical preservation issues, ...).	All data will be stored in ICTS - Standard Storage Solutions provided by KU Leuven (with automatic backup procedures) for at least 10 years, conform the KU Leuven RDM policy unless there will be legal or contractual restrictions in the case of tech transfer or valorisation events. Close consultation with LRD and ICTS will be conducted in those cases to ensure IP and data security. For materials, only the samples that preserve their original physical and chemical properties will be retained after the end of the project. Samples that have unstable properties, meant to be use for a limited number of experiments or for limited lifetime will not be preserved or preserved for at least 1 year after the preparation depending on the case.
Where will these data be archived (= stored for the long term)?	The data will be archived on the university's large volume storage servers (with automatic backup procedures) for at least 10 years, conform the KU Leuven RDM policy. The materials will be stored in special designed laboratory cabinets, in the case of stable samples.

What are the expected costs for data preservation during these 5 years? How will the costs be covered? *Although FWO has no earmarked budget at its disposal to support correct research data management, FWO allows for part of **the allocated project budget** to be used to cover the cost incurred.*	**The costs will be covered by the project's promotor.**

7. Data sharing and reuse	
Are there any factors restricting or preventing the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?	☒ Yes ☐ No If yes, please specify: **KU Leuven holds the IPR.**
Which data will be made available after the end of the project?	**All the data associated to published articles, conference abstracts and posters will be made available after publication or the end of the project, as requested by the FWO open access obligation. The data can also be made available via restricted access upon request of an individual (e.g. a researcher who intends to reproduce an experiment) after agreement of the project promotors.**

Where/how will the data be made available for reuse?	☒ In an Open Access repository ☒ In a restricted access repository ☒ Upon request by mail ☐ Other (specify): Published data: will be made available in an Open Access repository (Lirias, KU Leuven) Raw data, dataset and processed data can be made available upon request by email. Unpublished data: will be available upon request and after approval of the promotor. Data with IP potential: will undergo an embargo period until IP is secured or will be available in a restricted access repository
When will the data be made available?	**The results will be disseminated in journals with policy requiring disclosure upon.** **Data associated to publications will be made available upon publication. Results with IP potentials will go through an embargo period until IP is secured.**
Who will be able to access the data and under what conditions?	**Published data will be open to the scientific community.** **The unpublished data can be accessible upon request and with the prior authorization of the promotor.**
What are the expected costs for data sharing? How will these costs be covered? *Although FWO has no earmarked budget at its disposal to support correct research data management, FWO allows for part of **the allocated project budget** to be used to cover the cost incurred.*	**There will be no costs associated with data sharing.**

8. Responsibilities	
Who will be responsible for the data documentation & metadata?	**The researchers and the supervisor of the project (Stijn Van Cleuvenbergen)**

Who will be responsible for data storage & back up during the project?	**the supervisor of the project (Stijn Van Cleuvenbergen)**
Who will be responsible for ensuring data preservation and sharing?	**the supervisor of the project (Stijn Van Cleuvenbergen)**
Who bears the end responsibility for updating & implementing this DMP? *Default response: The PI bears the overall responsibility for updating & implementing this DMP*	**The PhD researcher and the supervisor of the project (Stijn Van Cleuvenbergen)**