

DMP title

Project Name My plan (FWO DMP) - DMP title

Principal Investigator / Researcher Kim Vanmeensel

Institution KU Leuven

1. General Information

Name applicant

Kim Vanmeensel

FWO Project Number & Title

Application number: G093822N

Functionally Graded Materials with Interpenetrating Phases made of Immiscible Alloys

Affiliation

- KU Leuven

2. Data description

Will you generate/collect new data and/or make use of existing data?

- Generate new data

Describe in detail the origin, type and format of the data (per dataset) and its (estimated) volume. This may be easiest in a table (see example) or as a data flow and per WP or objective of the project. If you reuse existing data, specify the source of these data. Distinguish data types (the kind of content) from data formats (the technical format).

WP	Type	Format	Volume	How Created
1 / 2	Matlab scripts	.m and .mat	max 5 Gb	Matlab software
1	CAD files	.stl, .stp, .step, .igs, .iges	max 100 Gb	Solid Edge, Creo, Inventore software
1	COMSOL files	.mph	max 100 Gb	Comsol Software
2	Thermocalc files	.tc	max 100 Gb	Thermocalc software
2	Microscopy images	.tif	max 10 Gb	Images of wetting experiments
5	Microscopy images	.tif	max 100 Gb	Images of microstructures (optical/scanning electron/transmission electron microscopy)
5	X-ray diffraction data	.csv, .raw	max 5 Gb	X-ray diffraction data
5	Mechanical test results	.csv, .txt	max 5 Gb	Test data from quasi-static and dynamic mechanical tests
5	Thermal and electrical conductivity results	.csv, .txt	max 5 Gb	Test data from thermal and electrical conductivity measurements

3. Legal and ethical issues

Will you use personal data? If so, shortly describe the kind of personal data you will use. Add the reference to your file in KU Leuven's Register of Data Processing for Research and Public Service Purposes (PRET application). Be aware that registering the fact that you process personal data is a legal obligation.

- No

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)

- No

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

Depending on the successful outcome of the research activities on the functionally graded Fe-based and W-based lattice structures as well as the liquid metal alloy infiltrated lattice structures, IP will be claimed. This will happen in close collaboration with the KU Leuven patent office, for which we are usually in contact with Wim de Clercq and Rachel Gregory.

Patenting the processing methodology, optimization of the graded structure and optimization of the compositional gradient strategy is aimed at.

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?

- No

4. Documentation and metadata

What documentation will be provided to enable reuse of the data collected/generated in this project?

A **unique labeling methodology** will be adopted. All sample labels will contain the date en job number of the processed and characterized material. A separate spreadsheet file will be continuously updated and physical samples will be stored in dedicated sample boxes also containing the unique sample labels.

Each sample will be described as follows:

- for homogeneous (H) lattice structures

1. Alloy composition used
2. LPBF scan parameters used to produce H lattice structure
3. Unit cell and size of the produced lattice structure
4. Link with the used CAD file describing the lattice structure
5. Other relevant LPBF processing parameters such as sample orientation and slicing strategy

- for functionally graded (FGM) lattice structures

Besides the parameters mentioned for H lattice structures, the gradient will be described

- direction of the porosity gradient
- porosity gradient function
- size and morphology of pores

Microscopy (optical, scanning electron, transmission electron) images will be stored per combination of lattice structure and infiltration alloy. The methodology and protocol will be described and stored in detail in a spreadsheet. A ReadMe file of the image collection will be written. A similar protocol will be followed for X-ray diffraction files, CAD files, Thermocalc files, mechanical and thermal/electrical test files and Comsol files.

Will a metadata standard be used? If so, describe in detail which standard will be used. If no, state in detail which metadata will be created to make the data easy/easier to find and reuse.

- No

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- for functionally graded (FGM) lattice structures

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- direction of the porosity gradient
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5. Data storage and backup during the FWO project

Where will the data be stored?

Since we will collaborate with researchers from other research units and groups, we will use OneDrive for active use of the data during the project.

How is backup of the data provided?

The data will be stored on the university's central servers with automatic daily back-up procedures.

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

Data will be stored in the cloud using KU Leuven OneDrive. Back-up files will be automatically stored on a daily base on external hard discs that will be financed by the allocated project budget

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

The total expected cost for data storage and backup during the project equals +/- 456 EUR. Two external hard drives with a capacity of 8 TB each will be bought, with a cost of +/- 200 EUR each, VAT incl., corresponding to a total cost of 400 EUR.

The use of KU Leuven OneDrive for Business is free of charge
(see: <https://admin.kuleuven.be/icts/english/services/lto/data-storage>)

The costs for data storage and backup are covered by the allocated project budget.

Data security: how will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The collected data does not contain sensitive or personal information. Therefore, no specific security measures are taken.

6. Data preservation after the FWO project

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 retained for a period of 10 years, conform the KU Leuven RDM policy.

Where will the data be archived (= stored for the longer term)?

The data will be stored on so-called 'Large Volume Archive Storage' of KU Leuven. The mirrored two external hard drives are also stored during this period of 10 years.

What are the expected costs for data preservation during the retention period of 5 years? How will the costs be covered?

The cost for 'Large Volume Archive Storage' of KU Leuven ICTS is € 100,86 EUR/TB/year, corresponding to an expected total cost of ~500 EUR.

The cost for data preservation is covered by the division. The division has allocated budgets to cover the costs.

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)?

- No

Which data will be made available after the end of the project?

The generated CAD input files and matlab files to couple the lattice design to COMSOL multiphysics simulations will be shared through GitHub.

Where/how will the data be made available for reuse?

- In an Open Access repository

Github (<https://github.com/about>) is an on-line platform where people build, store and distribute their software.

When will the data be made available?

- After an embargo period. Specify the length of the embargo and why this is necessary
- Upon publication of the research results

An embargo period will be in place in case the decision is made to take IP protection. In case of patent filing, the filing date will be the last day of the embargo period.

Who will be able to access the data and under what conditions?

The CAD files and Matlab scripts will be uploaded on Github as an open access dataset. Therefore, it will be available to anyone for any purpose, provided that they give appropriate credit to the creators.

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

No costs are expected.

8. Responsibilities

Who will be responsible for data documentation & metadata?

The PI, i.e. the PHD researcher working on the topic, and the post-doc supervising the PhD student.

Who will be responsible for data storage & back up during the project?

The PI, i.e. the PHD researcher working on the topic, and the post-doc supervising the PhD student.

Who will be responsible for ensuring data preservation and reuse ?

The PI, i.e. the PHD researcher working on the topic, and the post-doc supervising the PhD student.

The supervisor, prof. K. Vanmeensel.

Who bears the end responsibility for updating & implementing this DMP?

The PI bears the end responsibility of updating & implementing this DMP.