

DMP_1S13722N

Project Name DMP_1S13722N - DMP_1S13722N

Project Identifier 1S13722N

Principal Investigator / Researcher Pieter Adriaenssens

Project Data Contact Pieter Adriaenssens, tel: +32 16193401, email: pieter.adriaenssens@kuleuven.be

Description The objective of the project is (1) to develop a methodology for energy efficiency characterization for liquid-liquid dispersion processes and (2) to perform a comparative study on four liquid-liquid dispersion technologies. A variety of experimental data such as images and concentration profiles will be generated and processed to determine droplet size and residence time distributions under different experimental conditions. To main goal is to come up with a methodology to simplify the selection process of dispersion technology and increase the use of more (energy-)efficient technologies.

Institution KU Leuven

1. General Information

Name applicant

Pieter Adriaenssens

FWO Project Number & Title

1S13722N - "Energy efficiency as a tool to promote intensified liquid-liquid dispersion technology"

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).

The main results of the research will be published in scientific papers and a doctoral thesis. These will include a description of the methods and experimental procedures. The raw data will be stored on the laptop of the researcher, on his kuleuven OneDrive, a separate HDD, and after results have been used in a publication, the raw data will be transferred from the laptop to the NAS of Prof. Van Gerven for long term storage. The DMP will then also be updated.

Type of data	Format	Volume	How created
1. Design of reactors used in experiments			
Technical drawings/3D models of the designed reactors	.par, .stl, .dft, .asm, .cfg, .png, .svg, hand written notes	0.5 GB	In CAD software (e.g., Solid Edge, Solidworks, ...) and drawings made by hand.
2. Chemical experiments (liquid-liquid dispersion processes) performed in the Leuven Chem&Tech labs. Several parameters (e.g., torque, droplet size distribution, pressure drop) are monitored on-line or off-line.			
Microscopy images	.bmp, .tiff	5 TB	Transmitted-light microscopy with mounted Moticam Pro5Plus camera. Offline analysis of the dispersion process via sampling and stabilization.
High-speed camera images	.bmp	0.5 TB	A Photron high-speed camera is used to make in-situ images of the dispersion process
Physical properties of liquids	.xlsx, .csv	0.1 GB	Results of measurements of physical fluid properties (e.g., interfacial tension, viscosity, density, ...). The appropriate machine is selected for each property.
Torque/pressure drop/Residence time distribution/concentration measurements	.xlsx, .txt, .png, .svg	0.2 GB	Output from torque transducer, pressure sensor, UV-Vis, ICP, HPLC measurements
3. Automated routines (e.g., image analysis) are developed to analyze the data (e.g., images).			
Image analysis scripts	.py, .mat, .txt	0.5 GB	Code written by the individual researcher and colleagues working on similar challenges. Programming languages such as python and matlab will be used.
Droplet size distributions	.xlsx, .txt, .csv, .svg, .pdf, .png, .bmp, .tiff	1 TB	Output of image analysis code, Malvern Mastersizer300 laser diffraction

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

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?

- No

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?

- 1) For the microscope images the zoom settings and a description of the setup will be noted. The metadata will automatically be saved for each image and this will not be altered.
- 2) For the high-speed camera images the lens, zoom settings, a calibration image, the shutter speed and frame rate will be noted. Additionally, the settings of the light source will also be indicated. The metadata will automatically be saved for each image and this will not be altered.
- 3) Physical liquid property data will be accompanied by specifications of the measurement technique/apparatus and relevant conditions such as temperature.
- 4) Torque and pressure drop data will come with a documentation of the experimental conditions, a description of the setup, and the device settings (e.g., measurement frequency)

A README file will be compiled and updated after every publication. This file will contain a detailed research protocol, a description of the experimental setup, an overview of the investigated conditions, a description of how the data is generated and how it should be analyzed. This file will allow to re-do experiments and analysis.

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

There is no metadata standard available.

5. Data storage and backup during the FWO project

Where will the data be stored?

- During the research: data will be stored on the personal computer of the researcher, a HDD, the NAS of Prof. Van Gerven, and on the kuleuven OneDrive account of the researcher.
- After publication of an article: the data will be stored on the central servers of the university and the NAS.

How is backup of the data provided?

- The kuleuven OneDrive account of the researcher (daily basis)
- An external HDD (monthly basis)
- The NAS of Prof. Van Gerven which is configured in SHR-2 (every 3 months)

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

The laptop of the researcher has a SSD of 1 TB

The OneDrive account allows 2 TB

The external HDD is 5 TB

The NAS has a total capacity of 20 TB

If needed additional HDD's can be ordered (cost ~110€/5TB). The general operational budget of Prof. Van Gerven will cover this cost.

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

License KU Leuven Archive: €169 per TB per year.

The costs can be covered by the general operational budget of the research group of Prof. Van Gerven.

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

The computer of the individual researcher is password protected.

The OneDrive account has a two-factor authentication.

The HDD will be with the researcher or in a locked cupboard in his office (office is also locked).

The NAS is only accesible with unique login credentials.

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 the expected 5 year period after the end of the project. Redundant microscope and high-speed images will be removed to reduce the size of the stored data. The data will be stored on the university's central servers and the NAS of Prof. Van Gerven, conforming with KU Leuven's RDM policy.

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

In the OneDrive that will be transferred to Prof. Van Gerven, the NAS or the KU Leuven archive.

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

The KU Leuven Archive costs 169€ per TB per year. It is expected that approximately 4 TB of KU Leuven Archive will be needed (after removal of redundant images). As a result, the total cost over 5 year is estimated at €3400. This will be covered by the general operational budget of Prof. Van Gerven.

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?

1. After a publication, all datasets will be made available upon request, to whoever requests the data.
2. Unpublished data will only be accesible to the involved researcher and Prof. Van Gerven as it may be used in future projects.

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

- Upon request by mail

When will the data be made available?

- Upon publication of the research results

After a publication, all datasets will be made available upon request.

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

1. After a publication, all datasets will be made available upon request, to whoever requests the data.

2. Unpublished data will only be accessible to the involved researcher and Prof. Van Gerven as it may be used in future projects.

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

The costs are those for open access. It will be paid by general working budget of Prof. Van Gerven.

8. Responsibilities

Who will be responsible for data documentation & metadata?

Pieter Adriaenssens will be responsible for the implementation of this DMP.

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

Pieter Adriaenssens as well as KU Leuven ICTS managing OneDrive will be responsible for storage & back up of data during the project

Who will be responsible for ensuring data preservation and reuse ?

Prof. Van Gerven as well as KU Leuven ICTS managing OneDrive will be responsible for ensuring data preservation and reuse.

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

Prof. Van Gerven bears the end responsibility of updating & implementing this DMP.