PhD Fellowship

A Data Management Plan created using DMPonline.be

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Affiliation: KU Leuven (KUL)

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Template: FWO DMP (Flemish Standard DMP)

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Project Administrator: Irene Taurino

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Project abstract:

Monitoring tissue oxygenation provides vital clues on the status of numerous injuries and diseases. For instance, a state of insufficient oxygen supply (hypoxia), often suggests the immunological rejection of a freshly transplanted organ, the occurrence of ischemic events, or malignant tumor progression. Research shows that hypoxic tumors offer a stronger resistance to therapy, as well as increased metastatic spread. Thus, continuous monitoring of tumor oxygenation levels, prior to and during the course of treatment, is key in cancer therapy management. Unfortunately, the current golden standard for tumor hypoxia monitoring, the needle electrode method, is an invasive, repetitive, and non-continuous procedure. Thus, there is an urgent need for alternative oxygen sensing tools. We propose SenOx: a miniaturized, implantable, electrochemical oxygen sensor. Uniquely, SenOx will be built entirely from bioresorbable materials. A transient design will eliminate the need for secondary surgeries and electronic waste, whilst largely reducing inflammatory risks. Improving over the needle electrode method, SenOx will allow continuous in-situ oxygen monitoring with an envisioned operational lifetime of three weeks before undergoing full dissolution in the body. By bringing SenOx to a completion, we will be achieving a one-of-a-kind diagnostic tool, aligned with current technology and with a much-needed modern twist.

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1. 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.

Dataset Name	Description	New or reused	Digital or Physical	Only for digital data Digital Data Type	Only for digital data Digital Data format	Only for digital data Digital data volume (MB/GB/TB)	Only for physical data Physical volume
		Please choose from the following options: • Generate new data • Reuse existing data	*Please choose from the following options:* • Digital • Physical	*Please choose from the following options:* • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	*Please choose from the following options:* • .por, .xml, .tab, .cvs,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
PVD - thin film deposition	Growth-rate studies (thickness) and resistivity measurements.	NEW	Physical	• Experimental	• .pdf • .enex		Values directly read from the equipment, noted on a laboratory notebook and then copied onto a digital notebook (Evernote)
AFM	Surface morphology	NEW	Digital	• Observational • Experimental	• .jpg	< 100MB	
Confocal Microscopy	Fluorescent staining images for bio-validation	NEW	Digital	• Experimental • Observational	• .jpg	< 100MB	
Electrochemical methods (CV, CA, OCP)	Thin film characterization - performance	NEW	Digital	• Experimental	• .csv • .opju	< 100MB	
SEM	Imaging	NEW	Digital		• .jpg	< 100MB	
Ellipsometry	Bio-dissolution studies	NEW	Digital	• Simulation data	• .xlsx		
XDR/XPS	Surface chemistry - elemental analysis	NEW	Digital	• Experimental	• .csv • .xrdml	< 100MB	

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:

All data will be generated new.

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

• No

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- No

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

The work certainly has a potential for commercial valorization. RAW data, as well as detailed protocols and methods, will not be shared or disseminated beyond the research team. Treated data (shown in academic .ppt presentations or conference abstracts) will be prior ran through the LRD office for their assessment and input.

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 in the comment section to what data they relate and what restrictions are in place.

- No

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 in the comment section to what data they relate and which restrictions will be asserted.

- No

2. 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).

All protocols and methodology are kept in readme.txt and .pdf files, shared with the research supervisory team. Data collected directly from certain equipment (e.g. four-point-probe meter) with no possible digital data format(s), are kept in a physical and electronic laboratory notebook (Evernote).

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- No

3. Data storage & back-up during the research project

Where will the data be stored?

During the entire duration of the research, data files will be kept in the PhD student's (Catarina Fernandes) work laptop, automatically synced to her KU Leuven OneDrive account for continuous cloud storage, and shared with the supervisory team.

How will the data be backed up?

Additional backups will be archived in the protected ESAT cloud. Long-term data preservation (after research) will occur in Zenodo. Every 6 months, all data is backed-up into a physical pen-drive.

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

Given the rather small size of each individual file, we believe that we currently possess sufficient storage space. However, if this reveals to be untrue, standard data storage in the central KU Leuven data-centers offers a storage capacity of volumes between 100 GB and several TB.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Raw and treated data are stored in the PhD student's personal work computer and One Drive account, both which are password protected. Backups will be archived in the protected ESAT cloud. A physical pen-drive containing all current back-ups, is permanently stored in the personal residence of the PhD student.

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

Standard data storage in the central KU Leuven data-centers, for small volumes up to 500 GB, per 100 GB disk, can cost up to 251 euros (Price per TB per year). The cost can be supported by the yearly bench fee provided via the FWO grant.

4. 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...).

Data (raw and treated) can and may be preserved for 10 years, according to the KU Leuven RDM policy. The data will be archived long-term in Zenodo. Items will be retained for the lifetime of the repository. This is currently the lifetime of the host laboratory CERN, which currently has an experimental programme defined for the next 20 years at least.

Where will these data be archived (stored and curated for the long-term)?

The data will be archived long-term in Zenodo.

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

In Zenodo, content may be uploaded free of charge by those without ready access to an organised data centre.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in an Open Access repository
- Yes, in a restricted access repository (after approval, institutional access only, …)

As the project reaches a conclusion, the PhD student, supervisory team and KU LRD, must in face of the potential and intent of commercialization of the research results, assess what is the best strategy for long-term data storage (possibly partly with open access and restricted access).

If access is restricted, please specify who will be able to access the data and under what conditions.

The research team, and/or partners and collaborators under request.

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 in the comment section per dataset or data type where appropriate.

- No

Not momentarily.

Where will the data be made available? If already known, please provide a repository per dataset or data type.

Currently, all data is stored in a shared One Drive folder (with the supervisory team). In the future, we will consider larger storage platforms, such as Zenodo.

When will the data be made available?

Upon acceptance of a scientific publication or at the end of the PhD project.

Which data usage licenses are you going to provide? If none, please explain why.

To be discussed with the KU LRD.

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

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

See above, costs for the standard data storage in the central KU Leuven data-centers.

6. Responsibilities

Who will manage data documentation and metadata during the research project?

Catarina Fernandes

Who will manage data storage and backup during the research project?

Catarina Fernandes

Who will manage data preservation and sharing?

Prof. Dr. Irene Taurino

Who will update and implement this DMP?

Catarina Fernandes

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