# Developing a novel ceramic powder injection moulding process chain for high part quality (CIMpart)

*A Data Management Plan created using DMPonline.be*

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**Template:** KU Leuven BOF-IOF

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**Project Administrator:** Krishna Kumar Saxena

**Grant number / URL:** C3/23/060

**ID:** 205373

**Start date:** 01-03-2024

**End date:** 28-02-2026

**Project abstract:**

Ceramic powder injection moulding (ceramic-PIM) is a near-net shaping process for high volume and high precision production of complex ceramic parts. This process has rapidly evolved over the last decade due to market pull, driven by high demands of ceramic parts across several industrial sectors such as heat-resistant and wear-resistant precision components, biocompatible implants, heat sinks for microelectronics, luxury watches, etc. As investigated by the applicants in their recent EU project ProSurf, the ceramic-PIM suffers from three main challenges which include limited feedstock flowability, mould wear and repair and complex process knowledge. These challenges adversely affect the ceramic-PIM production of the majority of industries. With this C3 project, the applicants aim to overcome these challenges through innovative surface texturing (design to production), new mould insert material (hard and cobalt free), a new mould repair technique and ceramic process parameter knowledge. More than 10 industrial leaders in ceramic-PIM have expressed interest in this project allowing future patent exploration as a background for a follow-up EU project with an excellent consortium.

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**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 / ID | Description | New or reuse | Digital or Physical data | Data Type | File format | Data volume | Physical volume |
|---|---|---|---|---|---|---|---|
| | | *Indicate:* ***N****(ew data) or* ***E****(xisting data)* | Indicate: **D**(igital) or **P**(hysical) | Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify) | | Indicate: <1GB <100GB <1TB <5TB >5TB NA | |
| Flow-length-PIM | Flow length measurements in textured moulds | N | D | N | | < 1 GB | |
| Wear-PIM | The wear measurements on carbide moulds | N | D | N | | < 1 GB | |
| Machining | Machining data for carbide moulds | N | D | N | | < 1 GB | |
| ECM Current | Machining current data for electrochemical machining | N | D | N | | < 1 GB | |
| Experiments | Process and material pictures during experiments | N | D | I | | < 1 GB | |
| Texture data | Texture size, fabrication data | N | D | N, I, M | | <100GB | |
| | | | | | | | |

**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.**

- No

NA

**Will you process personal data? 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).**

- 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

Yes, the data on texture design and fabrication, machining data, and wear measurements will form a background for patent exploration with LRD.

**Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or 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

**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).**

The PIs will make sure that metadata (experiment date, user name, type of experiment, details of equipment, measurement units, etc.) will be added to the datasets for easy identification and data reuse.
A data description document will be created to record the data acquisition process and also on how to facilitate interpretation of metadata.

**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.**

- Yes

Please refer to the answer above.

**Data Storage & Back-up during the Research Project**

**Where will the data be stored?**

- OneDrive (KU Leuven)
- Sharepoint online
- Shared network drive (J-drive)

A TEAMS share point will be created.

**How will the data be backed up?**

- Standard back-up provided by KU Leuven ICTS for my storage solution

**Is there currently sufficient storage & backup capacity during the project?**

**If no or insufficient storage or backup capacities are available, explain how this will be taken care of.**

- Yes

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

The TEAMS SharePoint will only be accessible to the PIs and the 3 researchers involved in the project.

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

The total expected data storage volume is < 1 TB. Therefore, it is freely offered by KU Leuven.

**Data Preservation after the end of the Research Project**

**Which data will be retained for 10 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...).**

- All data will be preserved for 10 years according to KU Leuven RDM policy

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

- Shared network drive (J-drive)
- Other (specify below)

J Drive and also One Drive

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

The data volume is low so no significant costs foreseen.

**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.**

- Yes, as embargoed data (temporary restriction)

- Yes, as restricted data (upon approval, or institutional access only)

As the data is patentable, it will be restricted till patent is filed.

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

Only the project PIs and the researchers who will be paid on this C3 project will be able to access the data. Disclosure is not allowed until patent is filed.

**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, intellectual property rights

Patent exploration foreseen with LRD

**Where will the data be made available?**

**If already known, please provide a repository per dataset or data type.**

- KU Leuven RDR (Research Data Repository)

**When will the data be made available?**

- Other (specify below)

After patent filing

**Which data usage licenses are you going to provide?**

**If none, please explain why.**

- Other (specify below)

After patent filing - publicly available patent online

**Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.**

- No

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

Initial patent application cost by LRD.

## Responsibilities

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

Dr. ir. Krishna Kumar Saxena (KU Leuven)
Dr. ir. Tim Evens (KU Leuven, Diepenbeek)

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

Dr. ir. Krishna Kumar Saxena (KU Leuven)
Dr. ir. Tim Evens (KU Leuven, Diepenbeek)

### Who will manage data preservation and sharing?

Dr. ir. Krishna Kumar Saxena (KU Leuven)
Dr. ir. Tim Evens (KU Leuven, Diepenbeek)

### Who will update and implement this DMP?

Dr. ir. Krishna Kumar Saxena (KU Leuven)
Dr. ir. Tim Evens (KU Leuven, Diepenbeek)