Nearly Kähler spaces and their submanifolds

A Data Management Plan created using DMPonline.be

Creator: Michaël Liefsoens

Affiliation: KU Leuven (KUL)

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Project abstract:

This research proposal aims to better the understanding of the four fundamental homogeneous nearly Kähler six-manifolds by means of exploring their submanifolds. Specifically, the submanifolds considered are Lagrangian submanifolds, totally real submanifolds, almost complex submanifolds and Hopf hypersurfaces and will be explored in nearly Kähler complex projective three-space (CP3) and the space of full flags in three-dimensional complex space. The proposal aims to classify these submanifolds and prove an existence and uniqueness result for the nearly Kähler product of two three-spheres as well as for nearly Kähler CP3.

Additionally, new nearly pseudo-Kähler structures will be described and explored on the differential manifold CP3, building on recent developments in the description of nearly Kähler CP3 by the author. Again, the aforementioned submanifolds will be classified for these nearly pseudo-Kähler spaces. By providing a deeper understanding of nearly Kähler geometry and its applications in differential geometry, these findings will advance the field's knowledge.

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Nearly Kähler spaces and their submanifolds
DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

- Not applicable

Nearly Kähler spaces and their submanifolds
GDPR

GDPR

Have you registered personal data processing activities for this project?

- No

Nearly Kähler spaces and their submanifolds
Application DMP

Questionnaire

Describe the datatypes (surveys, sequences, manuscripts, objects …) the research will collect and/or generate and /or (re)use. (use up to 700 characters)

The data produced in the project amounts to theorems and their proofs within the framework of nearly Kähler geometry. These will be documented first in publicly (free, open) available preprints and later in peer-reviewed journals. The latex code for the manuscript and handwritten digital notes will be stored on my personal devices, as well as on personal cloud. Moreover, I will back-up the notes and latex code using a git repository especially created for this project. This GitHub repository will be kept online for the duration of the project and at least five years thereafter.

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)

During and after the research, the preprints will remain available in perpetuity on arxiv.org. This is the standard (free, open) respository in the mathematical community.
During the production of these preprints, the content will be stored on my personal computer and backed up frequently. Eventually the papers will be published in a journal where it will remain stored in perpetuity. Even then the preprint will be freely and openly available as it was originally on arxiv.org. KU Leuven's repository Lirias will also be used for archiving and facilitating access to the manuscripts.

What’s the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)

Not applicable.

Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)

Not applicable.

Which other issues related to the data management are relevant to mention? (use up to 700 characters)

Not applicable.

Nearly Kähler spaces and their submanifolds
FWO DMP (Flemish Standard DMP)

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.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
		Generate new data	Digital	Other	.pdf	<1GB	

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:

N/A

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.

- No

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.

- Yes

The preprints will be made available on the arXiv (a popular preprint sharing website in the math community). They will be under arXiv's "perpetual, non-exclusive license" which gives them limited, non-exclusive rights to distribute the arcle. So the data of preprints will be free and openly accessible. Published, peer-reviewed papers will be available based on an individual's subscription to the journal in question.

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).

I will follow standard stylistic practises for mathematical manuscripts. I will also use the Mathematics Subject Classification system as well as keywords to make the manuscripts (both preprint and published versions) easily searchable and findable for fellow researchers.

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.

- Yes

I will use the Mathematics Subject Classification system as well as keywords to facilitate easy exposure and searchability of my articles.

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

Where will the data be stored?

Preprints will be freely and openly published on the mathematical preprint sharing website arxiv.org. During their production, the content of these articles will be stored on my personal computer and backed up frequently. Eventually, the papers will be published in a journal where it will remain stored in perpetuity. Even then the preprint will be freely and openly available as it was originally on arxiv.org. KU Leuven's repository Lirias will also be used for archiving and facilitating access to the manuscripts.

How will the data be backed up?

The procedure will be to regularly (monthly) make back-ups of manuscripts as they are being produced. These back-ups will be stored on a separate device (cloud) from the computer where the manuscript is generated. Addionally, old versions of manuscripts in progress will be preserved in case reversion to earlier work is deemed necessary.

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

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

I will use a password and/or fingerprint system to secure any manuscripts stored on electronically accessible platforms. The password will be changed regularly.

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

I expect no additional costs.

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...).

All data will be retained for at least five years after the end of the project.

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

The preprint manuscripts will be stored (freely, openly) on the arXiv in perpetuity. The published manuscripts will be given to the journal of publication for them to store in whatever way they deem fit.

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

No additional costs are expected.

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.

- Other, please specify:

Preprints will be available in an Open Access repository; published articles will be available to any subscriber of the journal in question.

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

Any subscriber to the journal in question will be able to access the articles published therein.

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.

- Yes, Intellectual Property Rights

While preprints will be freely and openly accessible, access to published manuscripts will depend on an individual/institutions subscription to the journal. Preprints will remain available for access in perpetuity, however.

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

The data in preprint form will be made available on arxiv.org. This is the standard (free, open) respository in the mathematical community.

When will the data be made available?

As soon as the articles are written.

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

I will select journals that use one of, or something roughly equivalent to one of the following data license: Creative Commons Noncommercial License (CC BY-NC), Creative Commons No Derivatives License (CC BY-ND) or the Creative Commons Attribution License. Such licenses for published mathemacs arcles is the norm.
For preprints I will use arXiv's "perpetual, non-exclusive license."

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

a DOI will be added to each published arcle by the publisher.

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

I expect essentially zero data sharing costs.

6. Responsibilities

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

Michaël Liefsoens

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

Michaël Liefsoens

Who will manage data preservation and sharing?

Joeri Van der Veken (PhD supervisor)

Who will update and implement this DMP?

Michaël Liefsoens