K-theoretical invariants for C*-dynamics

A Data Management Plan created using DMPonline.be

Creator: Paul Meunier

Affiliation: KU Leuven (KUL)

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Project abstract:

This research project is situated in the area of operator algebras. More specifically, it follows up and extends on a recent description of equivariant Kasparov theory for C*-dynamical systems. The first objective is to redevelop the basics of equivariant KK-theory from the point of view of the Cuntz-Thomsen picture, including a self-contained new description of the Kasparov product. A parallel objective is to introduce equivariant KL-theory for C*-dynamical systems, to study its analogous properties as KK, and to deduce its role in the classification of group actions on Kirchberg algebras. The more ambitious part of the project is to explore consequences of the universal coefficient theorem à la Köhler-Meyer for group actions, at least for relatively tame cases such as actions of finite cyclic groups.
The last objective is to introduce a notion of ”equivariant total K-theory” and to investigate whether it relates to equivariant KL-theory in the spirit of the Dadarlat-Loring universal multicoefficient theorem for C*-algebras.

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K-theoretical invariants for C*-dynamics
DPIA

DPIA

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

- Not applicable

K-theoretical invariants for C*-dynamics
GDPR

GDPR

Have you registered personal data processing activities for this project?

- Not applicable

K-theoretical invariants for C*-dynamics
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)

Since the research project is purely theoretical (pure mathematics), the project does not use any raw data and only generates new primary data in the form of manuscripts to be submitted for publication as research articles. These are 100% reproduceable by themselves and there is no other related data to be stored in relation to them.

Thus I will not be working with any personal data.

All data produced (research articles) will consist of .tex and .pdf files.

The total volume produced should be of size < 100MB and will thus generate no extra cost for storage and preservation beyond the storage space that I have by default as a member of staff at KU Leuven.

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)

As is common practice in pure mathematics, all produced research articles will be permanently stored in open-access on the website arxiv.org. I will also deposit every article accepted for publication in LIRIAS, as per my deposit obligation as an author affiliated to KU Leuven (as indicated here: https://www.kuleuven.be/open-science/what-is-open-science/scholarly-publishing-and-open-access/open-access-kuleuven/deposit-obligation).

Due to the very small size of the data produced (<100MB), sufficient storage on LIRIAS is guaranteed.

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)

I do not wish to deviate from the principle of preservation of data.

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)

No.

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

None.

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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
		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, .csv,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
Research articles	These are the research articles produced during the PhD project.	Generate new data.	Digital.	Other (theoretical).	.pdf .tex	<100MB	None.

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:

None.

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

Indeed, all data consists of theoretical research articles.

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.

- 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).

As is customary in pure mathematics, all produced research articles will be made available on the website arxiv.org where they will be permanently stored. Every produced research article will also be available in open-access on the website LIRIAS. They will be freely accessible and usable with no time limitations, and will not need documentation to be used by an expert of the field (operator algebras).

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?

I will use the cloud service OneDrive for active use of the data during the project. Copies can be made and kept on personal devices.

How will the data be backed up?

The data will be stored externally by Microsoft using the cloud service OneDrive with automatic 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

Due to the very small size of the data produced (<100MB of .tex and .pdf files), sufficient storage is guaranteed.

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

The data is theoretical and thus there is no need for such measures. None of the data related to the project is personal, sensitive, or warrants strict access procedures. By the design of the university's online infrastructure, the data stored via OneDrive can only be opened on the personal computers of staff members, or remotely by logging into OneDrive with the credentials of the relevant staff member using 2-factor authentication. Given the low-risk nature of the data, we expect this to provide ample security.

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

There will be no extra cost beyond the storage space that I have by default as a member of staff at KU Leuven.

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...).

As is common in pure mathematics, the produced research articles will be permanently stored on the website arxiv.org. Every produced research article will also be permanently stored on LIRIAS, as I am obliged to do as an author affiliated to KU Leuven (as indicated here: https://www.kuleuven.be/open-science/what-is-open-science/scholarly-publishing-and-open-access/open-access-kuleuven/deposit-obligation). There will be no other project-related data to be retained or reused.

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

This will be on the website LIRIAS.

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

None.

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

All produced research articles will be made available in open-access on the website LIRIAS. There will be no other project-related data to be retained or reused.

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

The access is not restricted.

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

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

It will be made available on the websites arxiv.org and LIRIAS.

When will the data be made available?

As soon as the data is produced (that is, when the first versions of the research articles are written), it will be uploaded both in .tex and .pdf files to the website arxiv.org. When the research articles will be peer-reviewed and published, they will be made available on the website LIRIAS, as per the KU Leuven deposit obligation.

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

The license used on the LIRIAS website will be 'public access (as soon as legally possible, verified by OA Helpdesk).'

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.

- No

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

None.

6. Responsibilities

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

It will be me (Paul Meunier) and my supervisor (Gabor Szabo).

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

It will be me (Paul Meunier) and my supervisor (Gabor Szabo).

Who will manage data preservation and sharing?

It will be me (Paul Meunier) and my supervisor (Gabor Szabo).

Who will update and implement this DMP?

It will be me (Paul Meunier) and my supervisor (Gabor Szabo).