





**Technology Transfer Track Posters** 

# **Data reduction for X-ray science**



Research example – applying denoising to X-ray tomography data to improve compression

#### Who are we?

**LEAPS** is a consortium of large photon science facilities in Europe. Our facilities, such as synchrotrons and FELs, provide very intense and focused beams of X-rays and other radiation that can be used for academic and industrial research in a variety of areas. For example, in molecular biology, X-ray beams can investigate the structure and function of biomolecules relevant to medicine and drug development, and in materials science, it is possible to study the operation of devices such as solar cells or catalysts.

**LEAPS-INNOV** is an EU-funded project where 19 large photon science facilities are collaborating to develop innovative technologies relevant to their

## What are we working on?

- Developing and evaluating algorithms for data reduction. This has included, for evaluating example, denoising image algorithms to both improve image quality and make images more compressible, and investigating machine-learning-based optimization of compression parameters. An example of this is shown to the right.
- Disseminating knowledge data on **reduction** by running online seminars on data reduction in different areas of X-ray science, and organizing events such as a summit on compression in the HDF5 file format.
- Improving software libraries and tools for data reduction. Recently, in consultation with the company ironArray SLU, we integrated



Tomographic slice of magma flow (PSI, 2020)

experiments. Improvements in our facilities lead ever-increasing volumes of data being to produced, so one LEAPS-INNOV workpackage focuses on data reduction methods to reduce the costs of storing our data and make new, more data-intensive experiments feasible.

## For more information...

General information on LEAPS:

https://leaps-initiative.eu/

LEAPS-INNOV data reduction workpackage:

https://www.leaps-innov.eu/wp-7

Resources on data reduction for X-ray science:

https://gitlab.com/leaps-innov-wp7/resources



new features into the Blosc2 compression file format such as library and HDF5 JPEG2000 compression, to make it possible to more conveniently store large compressed datasets along with metadata.

## Who do we want to partner

with?

We are looking for a variety of partners. Firstly, we are interested in partnering with other Big Science Organisations with similar needs for data reduction, to share methods and software developments. Secondly, we would like to work with companies supplying instrumentation to photon science facilities (e.g. detector manufacturers) to integrate compression



Evaluation of compression algorithms on raw and denoised data

Thanks to Federica Marone, Jakob Vogel and Marco Stampanoni for data

methods into their products. Lastly, we would

also welcome contact with companies with expertise in data compression, highperformance computing and edge computing.

#### **BOOTH n. / HALL 28 - 27**

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https://www.leaps-innov.eu/wp-7



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