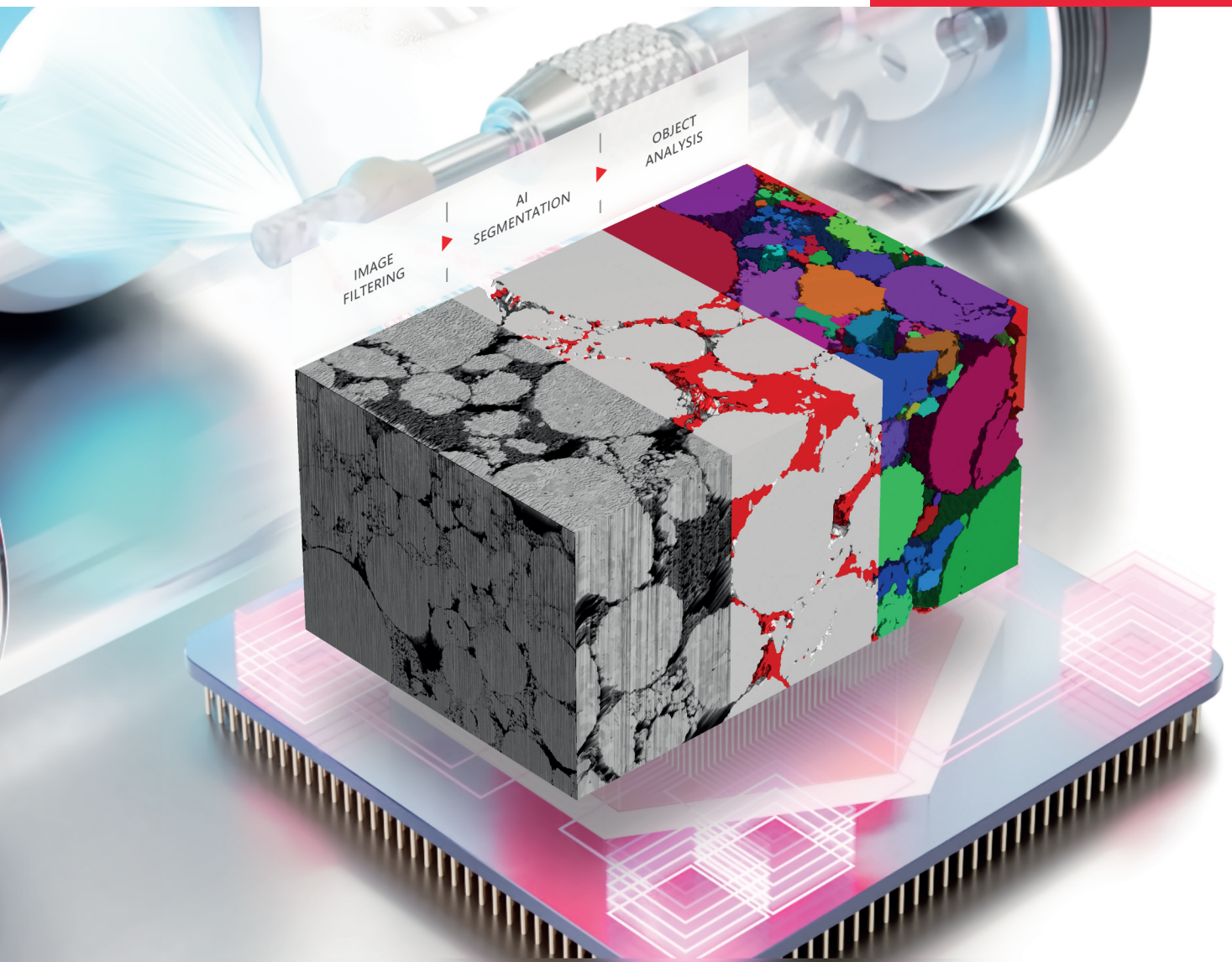


# GEO DICT

The Digital Material Laboratory

IMAGE  
PROCESSING AND  
IMAGE ANALYSIS



## THE MOTIVATION

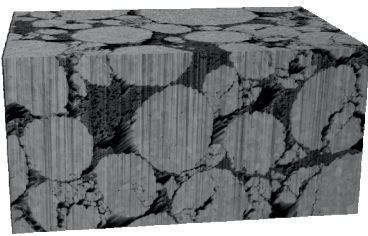
Modern imaging devices allow deep insights into the details of a material. Extracting these features and understanding the information contained in the images requires powerful image processing and image analysis tools.

## OUR SOLUTION

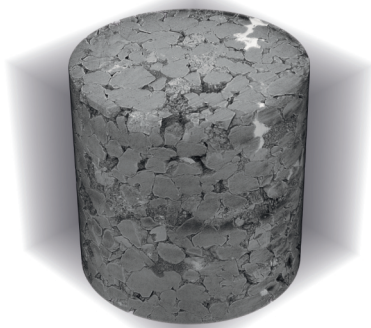
With GeoDict, we provide powerful solutions for image processing of micro-CT, FIB-SEM, and synchrotron scans. We combine these tools with advanced AI-powered image analysis methods for fiber, grain, or pore analysis.

## YOUR BENEFIT

Combining image processing, image analysis and simulation in one powerful toolbox reduces the overhead of additional interfaces. Complex workflows are carried out through a single software, capable of full automation and well documented.



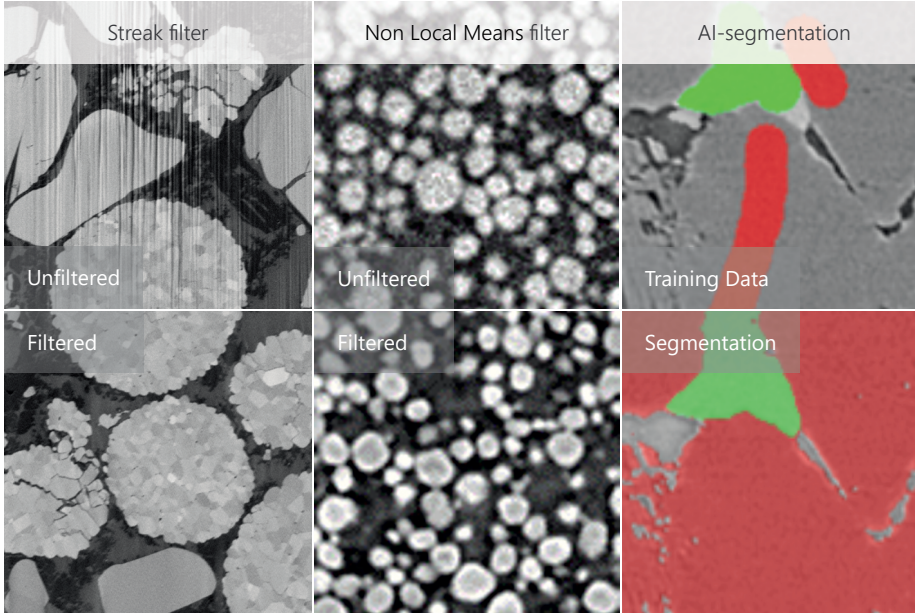
FIB-SEM scan of cathode



Micro CT scan of Berea sandstone

## IMAGING

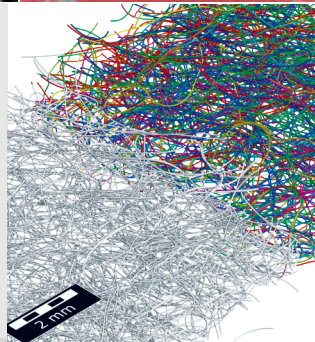
GeoDict supports import of scans from a wide range of sources and file formats. For example, raw or tiff.



## IMAGE PROCESSING

In GeoDict, we provide powerful high performance image filtering methods, automatic segmentation methods, and a state-of-the-art trainable AI segmentation solution that allows intuitive segmentation of complex scans.

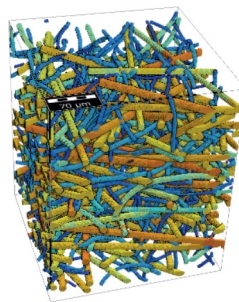
With the AI-powered image analysis tools in GeoDict, it is possible to identify individual objects and extract their geometrical properties in many different material types. For example nonwoven or long fiber composites. The same can be done for grains in rock samples or cathodes.



## MATERIAL ANALYSIS

GeoDict provides a wide range of solutions to analyze the geometrical properties of microstructures. With GeoDict, insights into the distribution of phases and porosity of materials can be obtained. Individual objects that make up a structure (e.g., fibers) can be identified and analyzed and statistics on these can be computed. The pore space may also be analyzed. These results are used to correlate to known physical properties of the materials or even create artificial models with similar properties. For example, with FiberGeo or GrainGeo.

Besides the object-based analysis, GeoDict provides tools to analyze porosity, material phase distributions, or orientations. For the pore space, characteristics such as connectivity, tortuosity, pore size, and pore throat sizes can be determined.



Results of the analysis may be used in GeoDict's structure generation modules (e.g., FoamGeo or FiberGeo) to generate digital twins of the original material that can be modified easily. All measurements done with GeoDict can be exported to Excel or accessed through a Python interface.

