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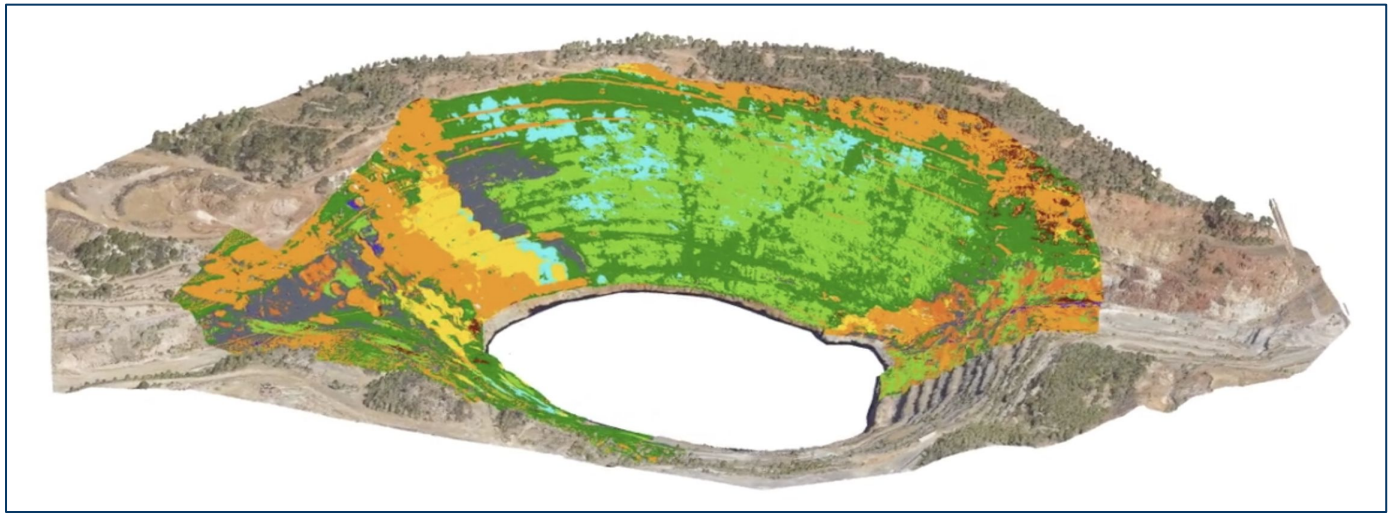
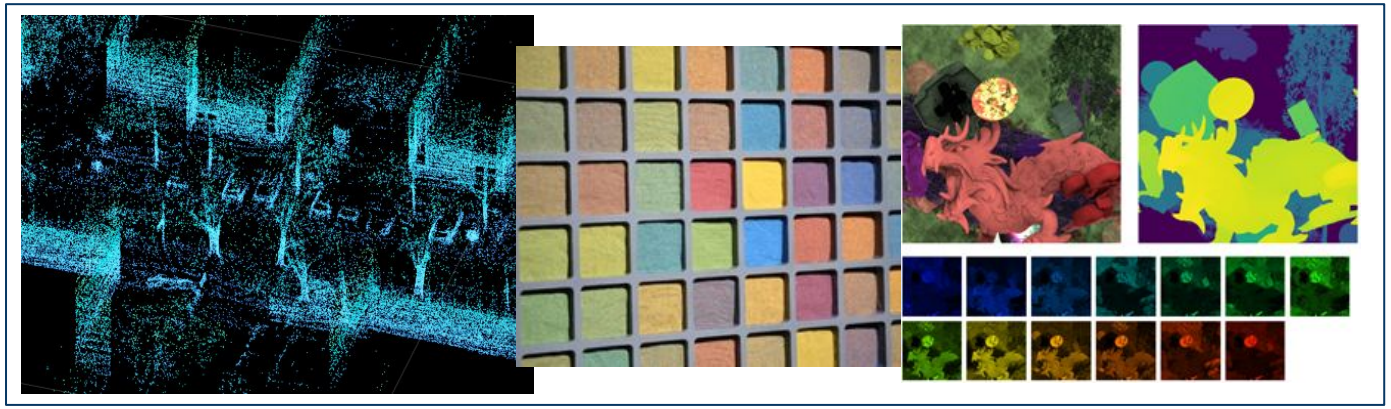
THEIA·X SPECTRAL EXPLORATION





Hyper 3D-AI

Artificial Intelligence for 3D multimodal point cloud classification

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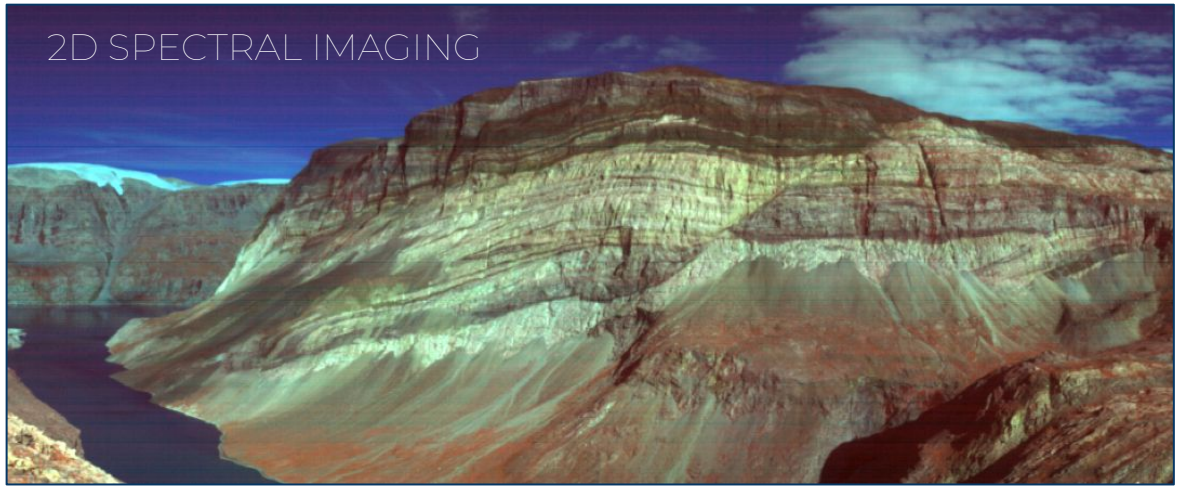
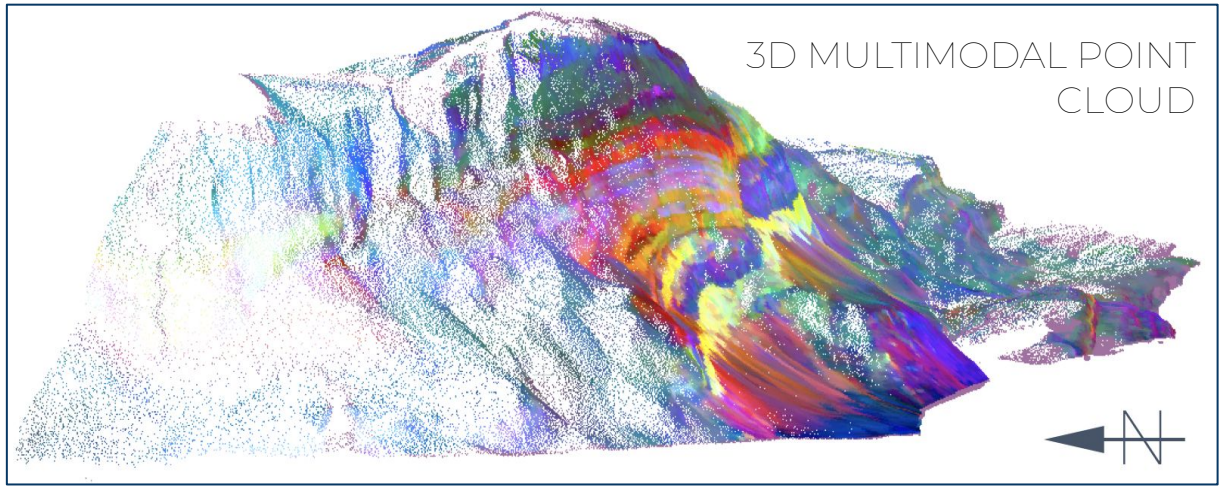
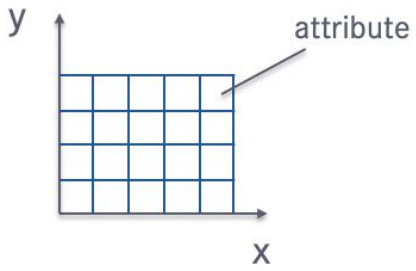
THE NEED FOR MULTIMODAL 3D PROCESSING

2D image space vs. 3D point cloud space

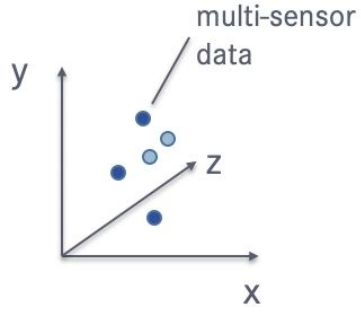






- major advances in image processing and AI (feature extraction, denoising, classification, ...)
- moderate storage requirements
- distorted spatial relations
- occlusions

- easy spatial data integration
- joining spatial features (shape, texture) with multimodal data characteristics (spectra, ..)
- object detection and segmentation
- limited AI implementation for monomodal point clouds (3D-CNN, PointNet)



The world is 3D, so AI should see it in 3D too!

MAIN PROJECT GOALS

1) creation of suitable **benchmark data sets**

2) method development for the **registration of multimodal 2D and 3D datasets** (hyperspectral image data, photogrammetric models, lidar, radar) into a common multimodal 3D point cloud

3) use and development of **artificial intelligence methods (deep learning) for classification of multimodal 3D data**, with a focus on the promising PointNet and 3D-CNN architectures as a basis

4) **demonstration** of the developed technology using two real-world application scenarios:

   a) *mapping of lithological domains in geosciences (keyword: resources)*

   b) *object recognition for autonomous systems (keyword: driver assistance/traffic safety)*