

## Johann Maximilian Zollner

Technical University of Munich, TUM School of Engineering and Design, Department of Aerospace and Geodesy, Professorship for Big Geospatial Data Management



## Objective

- Gain novel insights into storage mechanisms of organic carbon soils with spatial data mining to quantify the extent to which it is altering the functionality and interactions of soil microstructures in order to target effective carbon sequestration measures that will help mitigate climate change

## Research Question

- Can the spatial arrangement of soil microstructures be characterized using data science methods to demonstrate mechanistic implications for carbon transformation processes?

## Overview

- Interdisciplinary project of the TUM Chair of Soil Science with the Professorship of Big Geospatial Data Management → Research at the intersection of Data Science and Soil Science
- Development and adaption of spatial data mining methods (→ remote sensing), new spatial algorithms, data structures, software and infrastructure for Soil Science (+Educational aspect: Workshops, Hackathon, Browser-Tool)

## Work Packages

WP1	WP2	WP3	WP4
Data organization and exploratory analysis	Segmentation and quantification of spatial features and patterns	Topological analysis and spatial statistics	Link developed approaches and results to carbon dynamics

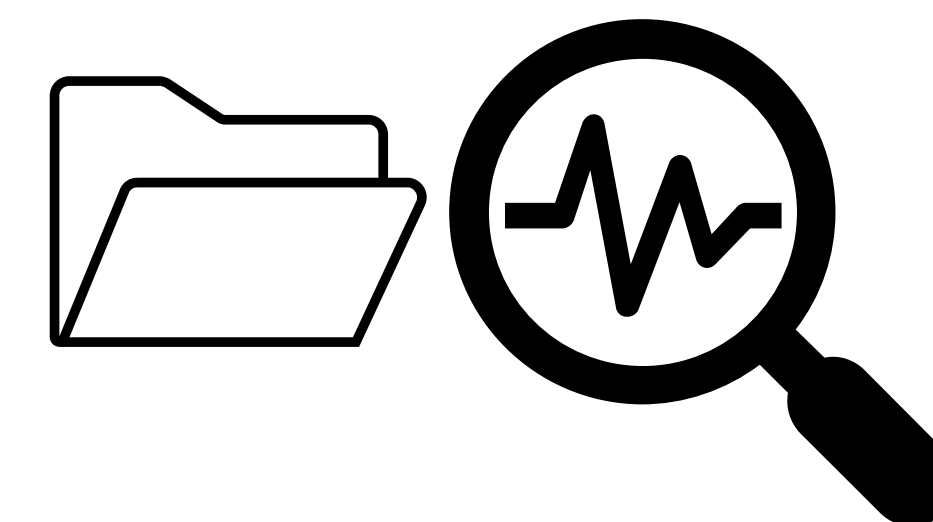
## Deriving spatial properties of soil carbon



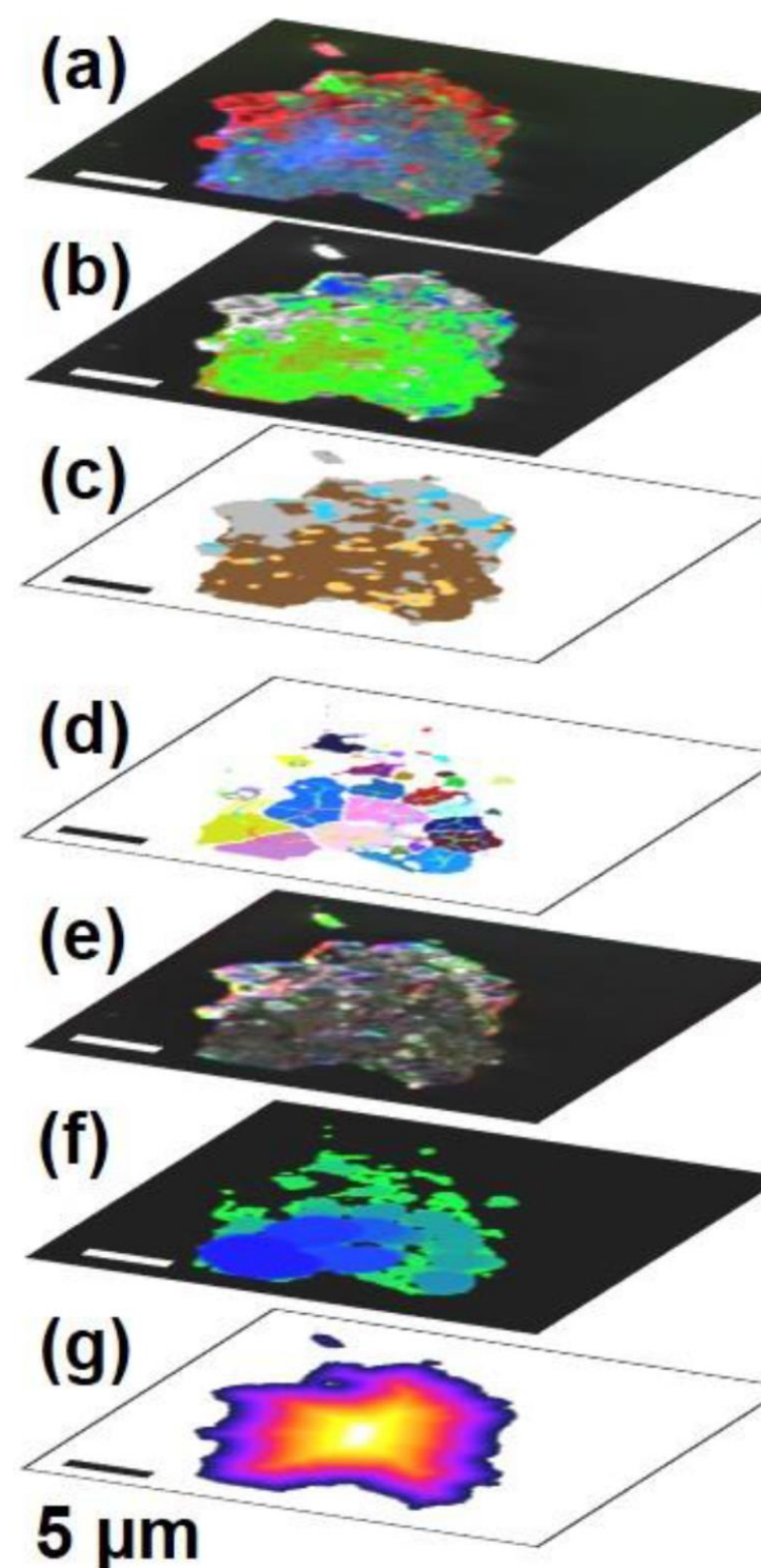
Soil as the largest terrestrial carbon storage



Cameca nano-scale secondary ion mass spectrometer 50L



Organization and exploratory analysis of massively collected data



Apply data-driven methods and models of Spatial Data Science

Identification and analysis of functionally connected spatial patterns