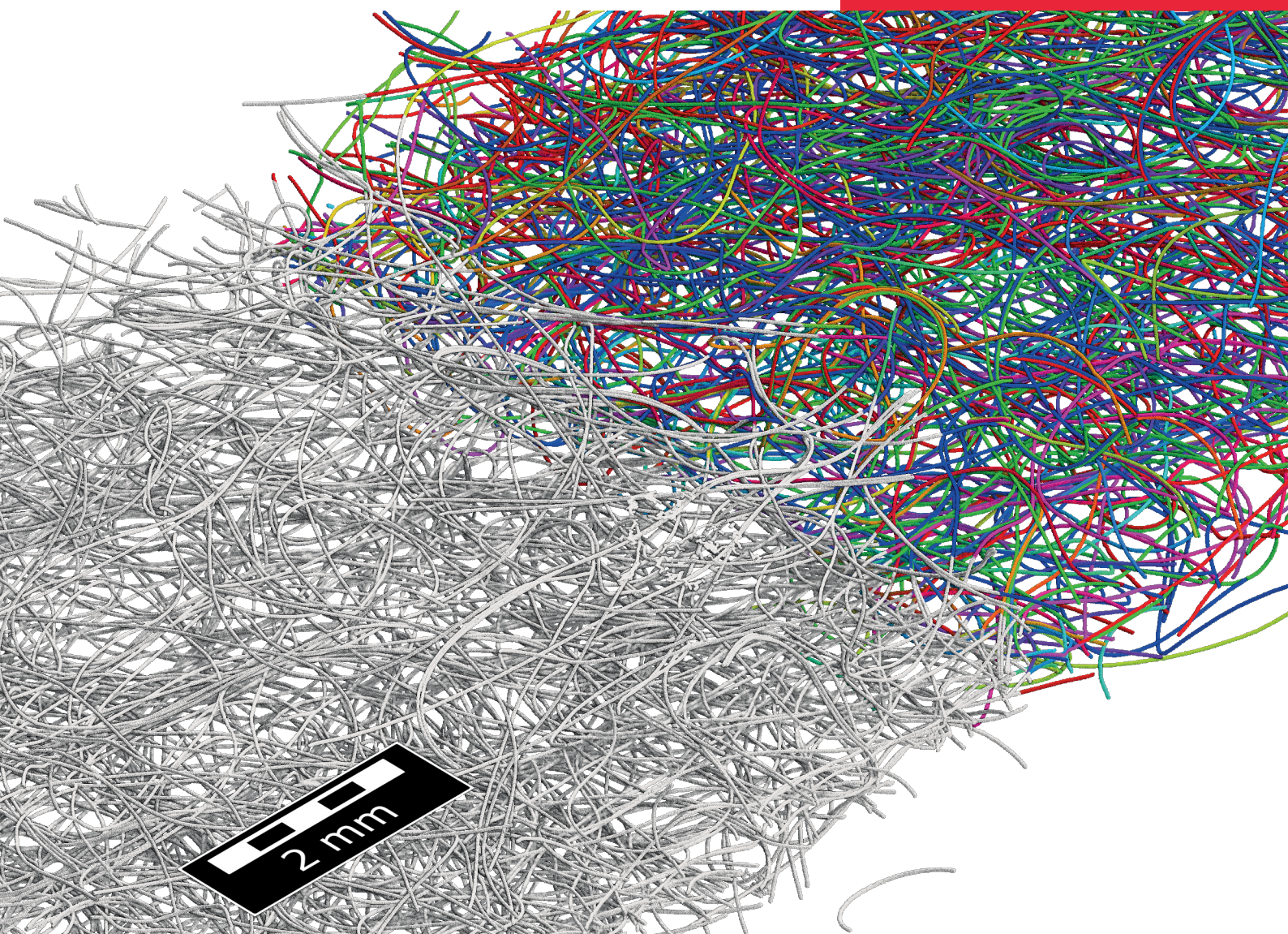# GeoDict

The Digital Material Laboratory
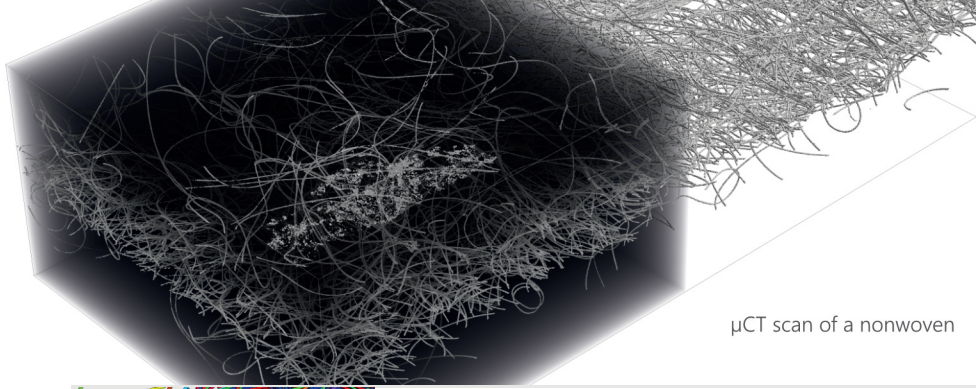
Nonwovens

2 mm

The Motivation

Improve nonwovens by adjusting basis weight, fiber diameter, length, and curvature, as well as pore space, to optimize both mechanical properties and flow characteristics.

Our Solution

Analyze the fiber structure and pore space in the nonwoven, design new nonwovens as 3D models and determine flow properties, mechanical properties, and thermal conductivity.

Your Benefit

Design new nonwovens and assess their performance before producing them. As a result, reduce time to market and match properties to customer's requirements.
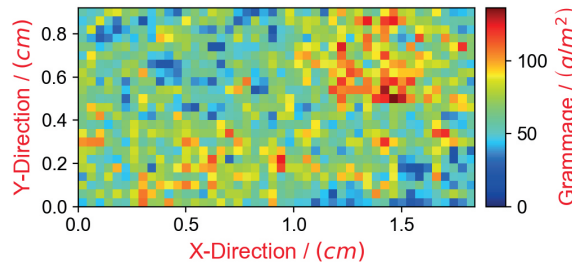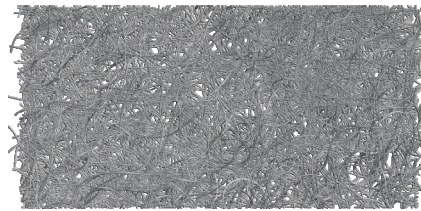
μCT scan of a nonwoven

Digitalization

Import a μCT scan of the nonwoven and improve its quality by using the image filters in GeoDict. Segment the scan with conventional or AI-based segmentation methods.
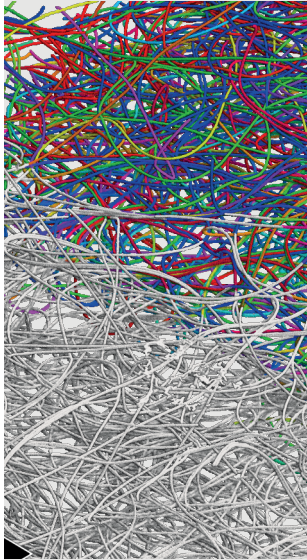

Single Fiber Indentification

Basis Weight Distribution

Microstructure Analysis

Analyze the fiber structure by identifying each individual fiber through Artificial Intelligence and get (layer wise) information on basis weight distribution and fiber diameters, orientation, curliness, and curvature.
Analyze the pore space to obtain pore size distribution, information on pore throats, etc.
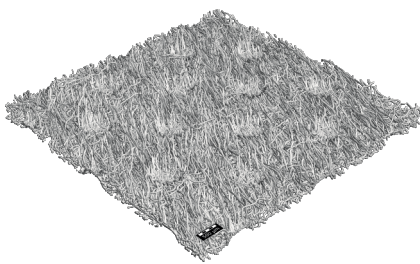
Microstructure Design

Generation of three-dimensional models of the nonwoven, including important features such as fiber cross-section, layer structure, bonding points, ...
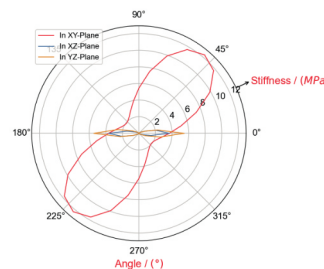
Predict flow properties of a nonwoven

- Simulate the permeability on models from μCT-scans or models generated with GeoDict
- Consider the influence of compaction of textile
- Get capillary pressure curve through two-phase flow simulation
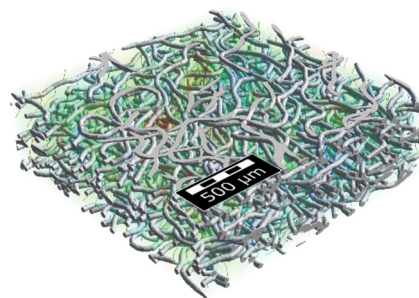
Simulate mechanical behavior of nonwoven

- Predict full stiffness tensor
- Simulate large deformations, such as compression or bending tests
- Include complex material laws for the fibers, such as plasticity

Property Prediction

Determination of the properties of the nonwoven, such as behavior under mechanical load, permeability, capillary pressure curves, tensile and flexural stiffness and thermal conductivity.

MATH 2 MARKET