GeoDict – A Toolbox for Digital Material Analysis and Development

Martina Hümbert, Andreas Grießer, Christian Wagner
## GeoDict® Solutions for...

<table>
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<th>Field</th>
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<tr>
<td><strong>Filtration</strong></td>
<td>For a clean environment</td>
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<tr>
<td><strong>Electrochemistry</strong></td>
<td>For electromobility</td>
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<tr>
<td><strong>Composites, Foams, Ceramics &amp; Metals</strong></td>
<td>For lightweight applications</td>
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<tr>
<td><strong>Digital Rock Physics</strong></td>
<td>For efficient energy production</td>
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GeoDict® Solutions Overview

3D Image Import and CAD Import

Filter Media, Composites, Diapers, ...

Cellulose Fibers

Ceramics, Granular Media, Packings

Open- and Closed-Cell Foams

Weaves and Textiles

Lattices, Grids, Regular Structures

Filters and Pleated-Filters

CAD-Meshes

Interfaces

Pore Analysis

Metrology

Battery Performance and Aging

Diffusion

Conductivity

Single Phase Fluid Flow

Mechanics and Deformations

Filter Efficiency and Filter Lifetime

Adsorption

Saturation and Two-Phase Flows

Acoustics

Identification of Fibers with AI

Identification of Grains

This is Innovation through Simulation
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Image processing

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Image processing

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COMPLETE IMAGE PROCESSING TOOLBOX

- 3D visualization
- Segmentation

Example of processing on µCT
- Correct ring artifacts

Example of processing on FIB-SEM
- Align slices
- Remove curtaining
## GeoDict® Solutions Overview

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Microstructure analysis
IDENTIFY FIBERS IN COMPOSITES USING ARTIFICIAL INTELLIGENCE

FiberFind analyzes:
- Fiber diameter distribution
- Fiber length distribution
- Fiber orientation

Input: CT scan  
FiberFind-AI  
Output: labeled CT scan

Fiber diameter distribution:
**IDENTIFY FIBERS IN NONWOVEN USING ARTIFICIAL INTELLIGENCE**

**FiberFind** analyzes:
- Fiber diameter distribution
- Fiber length distribution
- Fiber orientation
- Individual fiber tracking

**Input:** CT scan  
**Output:** labeled CT scan
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367x357

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DEVELOPMENT OF AN ARTIFICIAL EARDRUM

- Artificial membrane manufactured by electro spinning
- Modelled with GeoDict based on SEM images
- Determination of stiffness tensor with GeoDict
- Stiffness tensor is input for modal analysis
- CT-scans of most promising prototype membranes
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Simulation and property prediction

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Compression of a single bead
THANK YOU FOR YOUR ATTENTION

Visit us at booth B-24 (1st floor)

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