

Workshop 25 - 26 June 2026  
Fraunhofer IWM, Freiburg, Germany

Materials Characterization  
for Industrial R&D: From  
Fragmented Data Towards  
AI-powered Workflows



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### What we will do

- Learn about modern data organization and standardization techniques to prepare your data for digital workflows
- Accelerate the analysis of microscopy data using accessible AI methods through a graphical cloud platform

### Who should participate

Material researchers, R&D engineers, metallographists and lab managers working with materials data who want to streamline workflows

### Why you should participate

- **Increase Efficiency:** Say goodbye to manual data maintenance. Learn how to turn isolated measurement data into connected assets.
- **Understand Technology:** Demystify AI and standardization principles through practical application in a lab context.
- **Low Barrier to Entry:** Experience how Computer Vision and »Chat with your Data« (LLMs) make your work easier – no coding skills needed.
- **Practical Implementation:** Work directly with real steel data and cloud tools instead of just listening to theory

### Prerequisites

- Basic familiarity with materials characterization techniques (tensile testing, microscopy, or similar).
- No programming or AI experience required.

### Location

Fraunhofer-Institute for Mechanics of Materials IWM  
Woehlerstrasse 11 | 79108 Freiburg | Germany

### Contact

Dr. Dirk Helm | dirk.helm@iwm.fraunhofer.de  
Dr. Maxim Zapara | maxim.zapara@iwm.fraunhofer.de

### Workshop Committee

Dr. Dirk Helm (Fraunhofer IWM)  
Dr. Michael Sluydts (ePotentia)  
Prof. Leo Kestens (Ghent University)  
Dr. Ilchat Sabirov (IMDEA)  
Dr. Gerhard Goldbeck (EMMC)

### Fees

Participation in the workshop is **free of charge** (including lunch and coffee breaks on both days). As places are limited, please register by **30 April 2026** by **clicking on the link below**.

### [Registration Link](#)



AI-powered Characterisation and  
Modelling for Green Steel Technology



ePotentia  
Data•Science•Cloud



Horizon Europe Project n° 101091912  
HORIZON-CL4-2022-RESILIENCE-01-19

## Transforming Material and Process Data Into an AI-ready Connected and Sustainable Asset

Labs generate massive amounts of data daily – often hidden in isolated files and spreadsheets. This wastes time and slows down innovation. In this workshop, you will experience how digitalization in the lab actually works:

- **Connect:** Automate data capture instead of manual typing.
- **Understand:** Use AI tools to interpret results faster – without any programming.
- **Benefit:** Reduce waste and make smarter decisions. Make your data future-proof – simple, understandable, and practical.

### Workshop Format

Sessions balance lectures, live demonstrations, and interactive exploration. To ensure smooth demonstrations and optimal learning experience, AI analysis sessions work with pre-processed example datasets. This allows focus on interpreting results and understanding workflows rather than waiting for compute-intensive processes.

### Software & Hardware Requirements

- Please bring your own laptop or tablet
- Web browser (Chrome, Firefox, or Edge recommended)
- No software installation required
- Platform is cloud-based and accessible from any internet-connected device

## Workshop Program

Day 1: Thursday, 25 June 2026

### Morning Session

Digitalization that Pays Off – Standardizing Workflows for Predictive AI (Fraunhofer IWM)

- Industrial challenges: The cost of fragmented data in Green Steel technology
- Beyond the Spreadsheet: Solving the Challenge of Fragmented Material Data
- Standardizing Experimental Workflows for FAIR Data
- Showcase: Accelerating Creep Assessment with AI

**Your Added Value:** You will learn how to reduce costs by standardizing experimental workflows and how FAIR data enables predictive AI for material performance.

### Guided Tour of Fraunhofer IWM Labs

**Your Added Value:** You will follow the data journey live – from the physical tensile or creep test directly into the integrated digital environment

### Afternoon Session

Connecting the Lab and the Cloud – Workflow Implementation (Fraunhofer IWM)

- Hands-On: Implementing Digital Documentation
- GenAI in the Lab: From Data Entry to Intelligent Conversation

**Your Added Value:** You will work with test data to create standardized documentation and see how AI can revolutionize data querying in the lab.

Day 2: Friday, 26 June 2026

### Morning Session

Platform Essentials & AI Tools (ePotentia/Ghent University)

- Materials data management and analysis in the age of AI.
- Introduction to MicrostructureDB Platform
- Hands-On: Data Organization in MicrostructureDB
- Introduction to Large Language Models for Materials Data
- Interactive Session: Conversational Data Exploration

**Your Added Value:** You will learn to organize microstructural data effectively and use natural language AI to explore complex datasets without writing code.

### Afternoon Session

Advanced Microscopy with AI (Ghent University/ePotentia)

- Introduction to AI for Optical and Electron Microscopy
- Guided Exploration: AI-Analyzed Steel Microstructure Datasets
- Wrap-Up and Next Steps

**Your Added Value:** You will discover how computer vision automates phase detection and how machine learning accelerates the analysis of grain orientation and texture maps.