

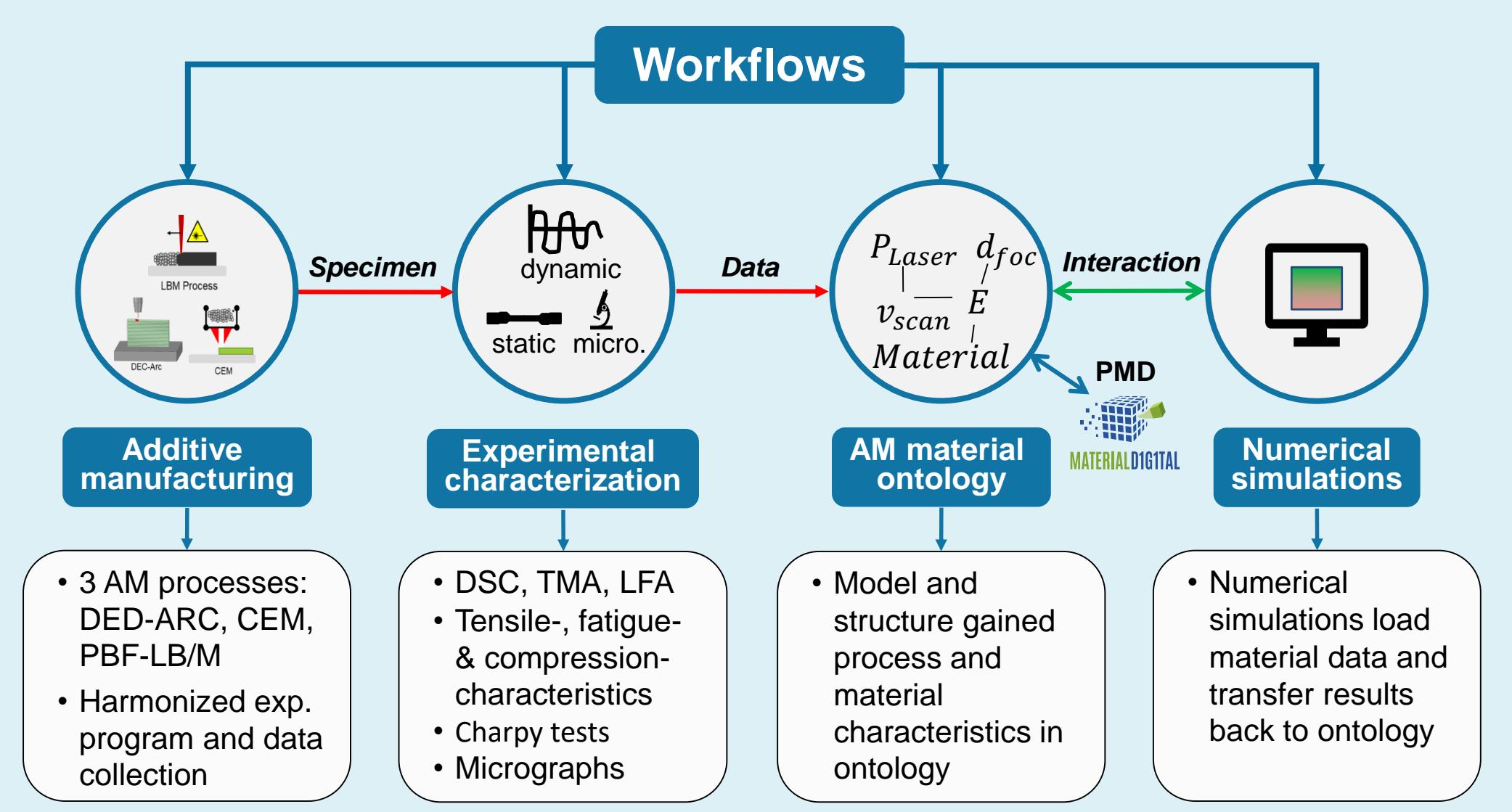
# ODE\_AM - Ontologien für die dezentrale Erfassung von mehrskaligen statischen und zyklische Kennwerten von additiv gefertigten Stahlstrukturen aus Experiment und Simulation



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## Overview



## Ontologies and workflow

### Ontology development

Modeling of AM metal structures and description of the manufacturing process related information: process parameters, material and geometric information.

AMO: Additive Manufacturing Ontology

LPBF: Laser Powder Bed Fusion Ontology

CEM: Composite Extrusion Modelling

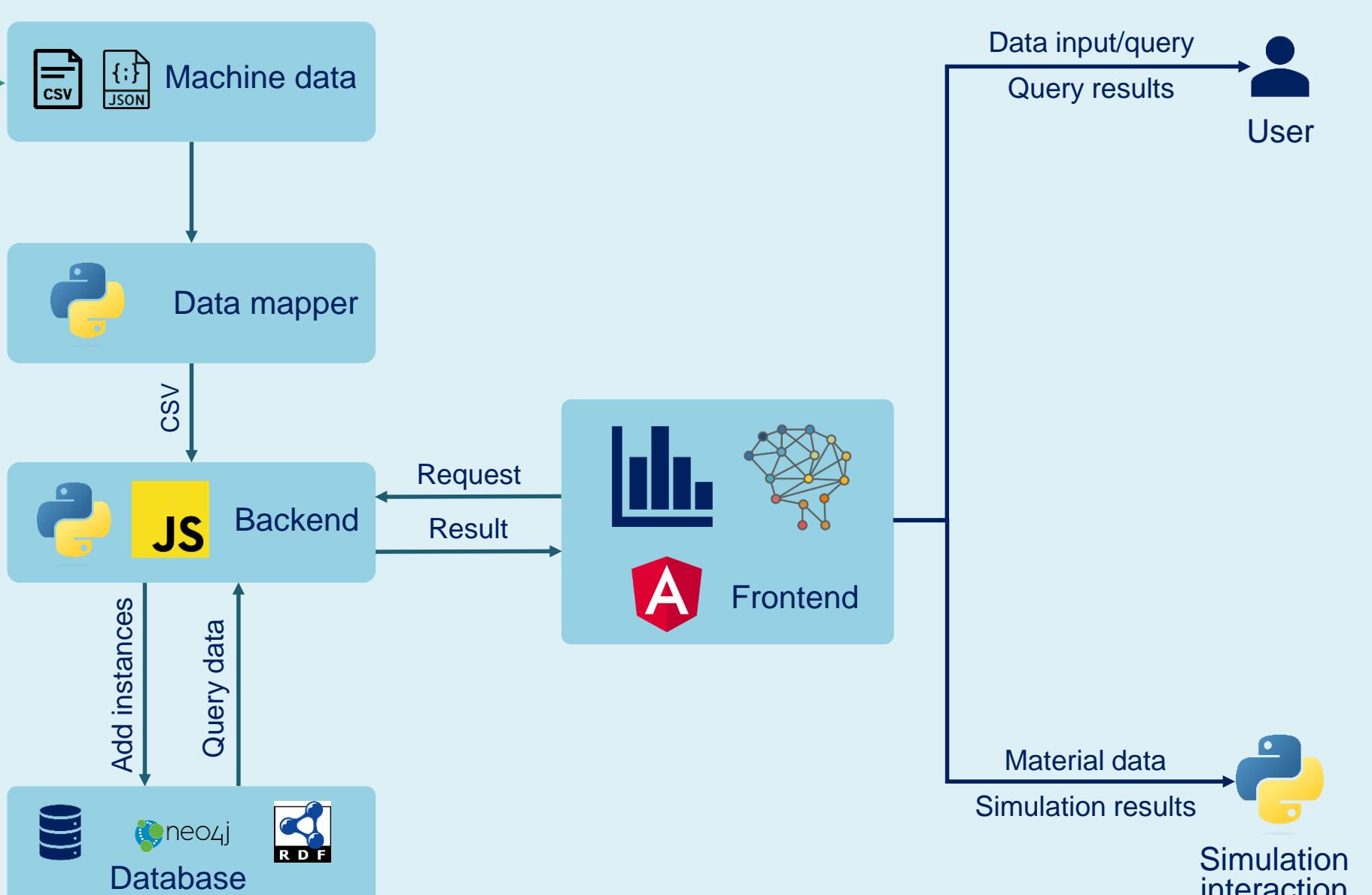
WAAM: Wire Arc Additive Manufacturing

BFO: Basic Formal Ontology

CCO: Common Core Ontologies

MT: Mechanical Testing Ontology

### Data workflow

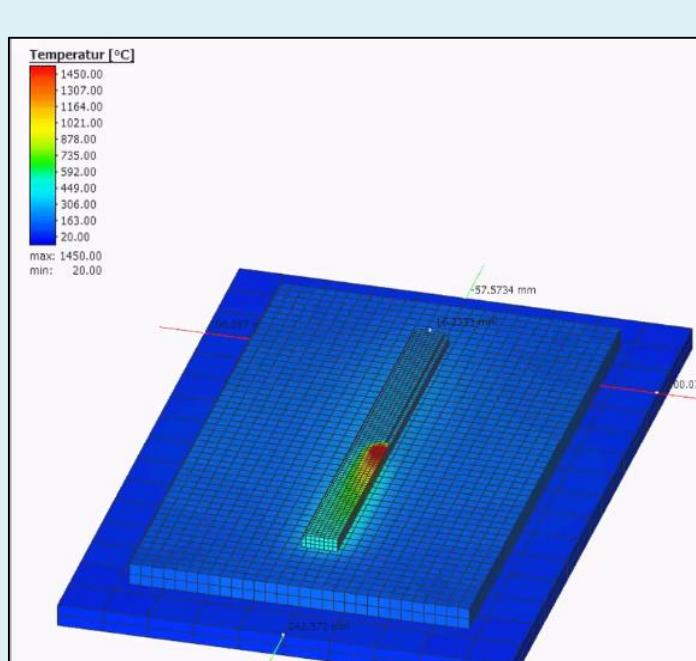


## Simulation

### Ontology interactions

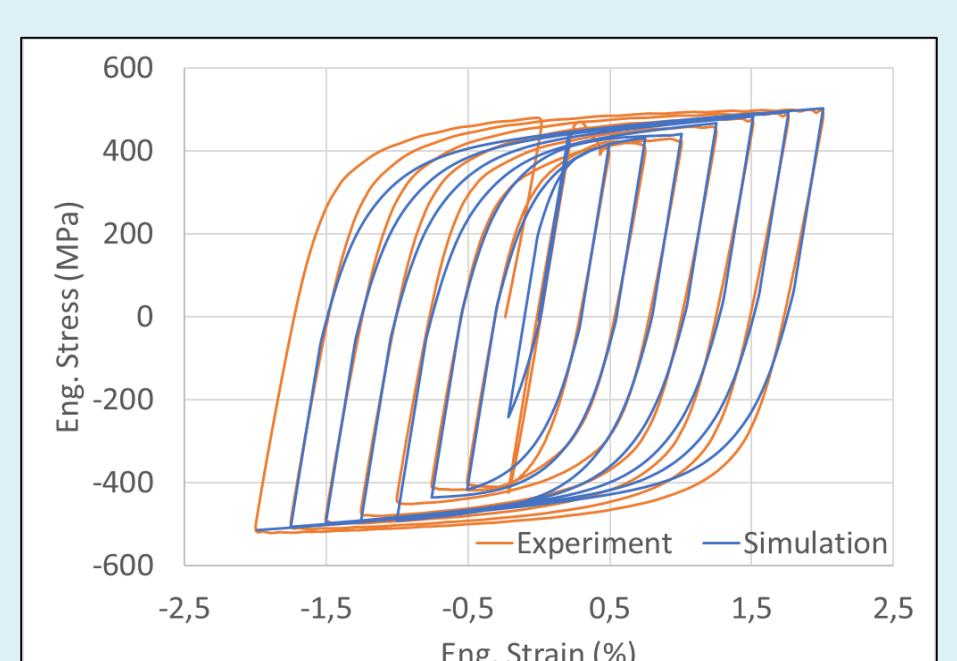
- Static/Dynamic analysis: Python grabs material data from ontology and transfers them to necessary format of material cards as an input for commercial simulation tools
- Process simulation: Results from thermo-mechanical process simulation (i.e. time t8/5 for DED-Arc process) are transferred from simulation tool back to ontology

### Process simulations



- Structural welding simulation of DED-arc process
- Thermo-mechanical analysis (temperature field, distortion)

### Structural simulations



- Parameter determination of constitutive model for AM steels with yield plateau
- Validation of simulation result

## Additive manufacturing and characterization

