



Challenge
Import a Microstructure



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VTK Header (1/2)

Adapt the rectilinear grid VTK exported by Dream3D

- *Open the VTK file in a text editor (e.g. Notepad++)*
- *Modify the header (esp. the name of the field is case sensitive)*

```
1 # vtk DataFile Version 2.0
2 Data set from ImportExport Version 6.5.138.16ffde7a1
3 ASCII
4
5 DATASET RECTILINEAR_GRID
6 DIMENSIONS 201 2 201
7 X_COORDINATES 201 float|
8 -0.750000 0.750000 2.250000 3.750000 5.250000 6.750000
9 21.750000 23.250000 24.750000 26.250000 27.750000 29.2
10 30.750000 32.250000 33.750000 35.250000 36.750000 38.2
```

Dream3D rectilinear

```
1 # vtk DataFile Version 2.0
2 Data set from ImportExport Version 6.5.138.1
3 ASCII
4
5 DATASET STRUCTURED_POINTS
6 DIMENSIONS 201 2 201
7 SPACING 1.5 1.5 1.5
8 ORIGIN 0 0 0
9
```

MICRESS structured points

- *Remove the X/Y coordinates blocks*
- *The file should continue with CELL_DATA after the ORIGIN line*
- *Save it as 'micress_2Dmicrostructure.vtk'*



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Importing the vtk file into MICRESS

Prepare your driving file:

- *Start with a copy of T10_01_GrainGrowth_2D example*
- *Change output location to*
 - *e.g. Results/GrainGrowth_fromD3D*

Challenge

- *Set an initial 2D microstructure from the VTK file you got before*
- *Apply an identical phase 1 and a zero orientation to all grains*



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Geometry

Grid size?

(for 2D calculations: CellsY=1, for 1D calculations: CellsX=1, CellsY=1)

Cells in X-direction (CellsX):

200

Cells in Y-direction (CellsY):

1

Cells in Z-direction (CellsZ):

200

Cell dimension (grid spacing in micrometers):

(optionally followed by rescaling factor for the output in the form of '3/4')

1.5

#

*Match RVE size in X, Z and
spacing with Dream3D
simulation domain*

*Especially
set Y=1
Because of 2D slice export from
Paraview*

Read grain structure from vtk file

Identifier for grains is

„FeatureIds“





Reading of initial structure: Grain IDs

```
# Initial Microstructure
# =====
# Type of grain positioning?
# Options: deterministic random [deterministic_infile] from_file
from_file
# Filename of initial grain/phase structure [VTK_identifier (default=korn)] ?
micress_2Dmicrostructure.vtk FeatureIds
# Treatment of data?
# (n: none, 1: 1D, x: rotate Clockwise along x-axis, y, z,
# or p: 'phase to grains transformation')
n
# Number of grains at the beginning?
# (Set to less than 1 for the number of grain to be read from the input data,
# with optionally a minimal size, in cells)
-1
# Read grain properties from a file?
# Options: input from_file identical blocks
identical
# Phase number? [grain group] (integer)
1
# Rotation angle? [Degree]
0.0
....
```

Read grain structure from vtk file

Identifier for grains is

„FeatureIds“



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Read properties from a file

So far so good ...

How to get the property file ?

- *Manually*
 - *See solution video to learn setup with*
 - *Text editor and Excel*
 - *Tedious task ... we will skip it here !*
- *Check auxiliary files for the Dream3D Challenge*
 - *Copy '2D_microstructure.vtk' and 'FeatureProp.txt' for this challenge*

*This feature file was generated with the converter script,
see <https://github.com/access-technology/hdf2mic-converter>,
using the d3dtomic.json configuration file.*

The script is not available on the lab computers. Check it out at home!





Import

```
# Initial Microstructure
# =====
# Type of grain positioning?
# Options: deterministic random [deterministic_infile] from_file
from_file
# Filename of initial grain/phase structure [VTK_identifier (default=korn)] ?
micress_2Dmicrostructure.vtk FeatureIds
# Treatment of data?
# (n: none, 1: 1D, x: rotate Clockwise along x-axis, y, z,
# or p: 'phase to grains transformation')
n
# Number of grains at the beginning?
# (Set to less than 1 for the number of grain to be read from the input data,
# with optionally a minimal size, in cells)
-1
# Read grain properties from a file?
# Options: input from_file identical blocks
from_file
# Filename of properties of the grain structure?
FeatureProps.txt
#
```

Read properties from file



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Input format for orientations

```
# Phases
# =====
# Selection of Phases
# -----
# Phase 0 (matrix phase)
matrix
# Phase 1
phase_1
# Phase 2
end_of_phases
#
#
# Input/Output Format for Orientations
# -----
# How shall grain orientations be defined?
# Options: angle_2d euler_zxz angle_axis miller_indices quaternion
euler_zxz
#
```

*Euler angles were exported
from Dream.3D*

