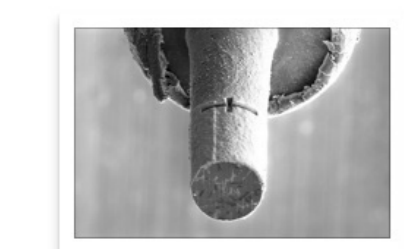
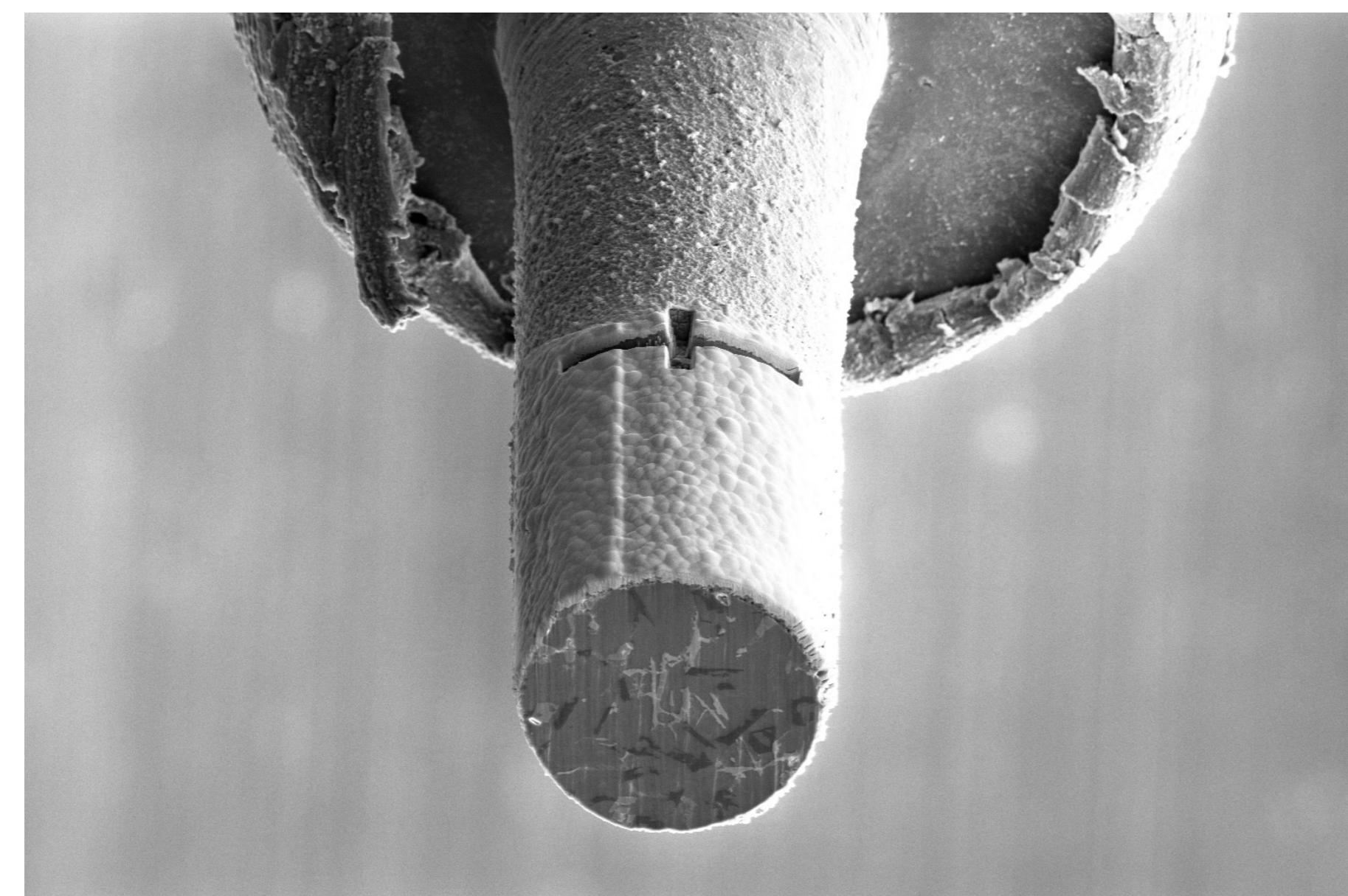


A Tool for Automatic Metadata Extraction and Schema Mapping for SEM Images

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Introduction

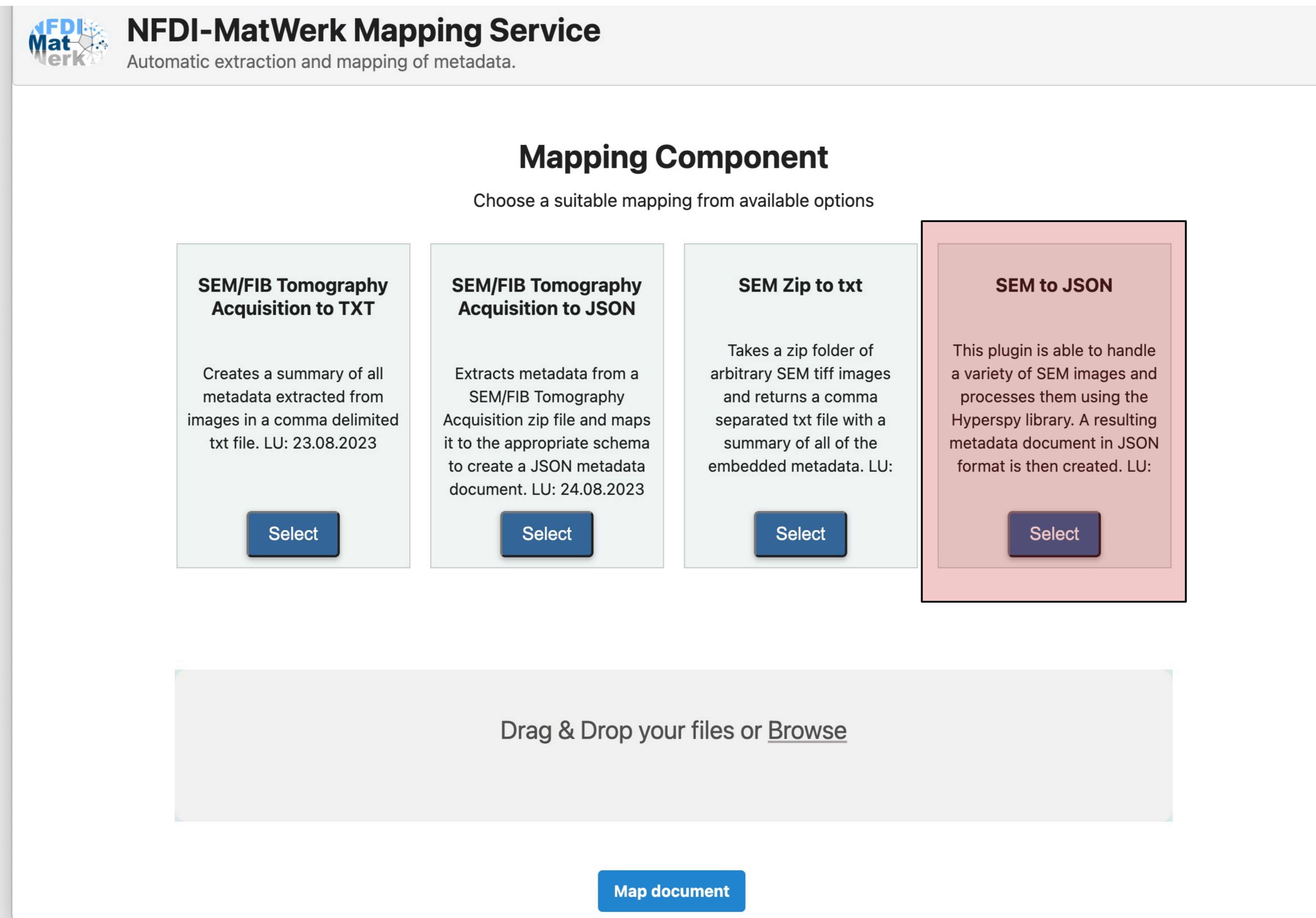
The Mapping Service is a tool hosting various plugins that enable automatic metadata extraction from research-generated files and their subsequent mapping to a schema developed in collaboration with the appropriate experts. An example workflow using Scanning Electron Microscope- (SEM) generated images is showcased, from extracting unstructured metadata to the creation of a structured metadata document in a familiar JSON format.



SEM Image - SlicedImage - 001.tif

```
[EBeam]
Source=FEG
ColumnType=Elstar
FinalLens=Elstar
Acq=PIA 3.0
Aperture=AVA
ApertureDiameter=4.53e-005
HV=15000
HFW=0.000592
VFW=0.000394667
WD=0.00402349
BeamCurrent=1.6e-009
TiltCorrectionIsOn=no
```

An example SEM image with an excerpt of its embedded metadata. The highlighted values show just a couple of the metadata parameters which are required by the schema, and therefore must be extracted and mapped according to criteria defined by a community-approved schema.



NFDI-MatWerk Mapping Service
Automatic extraction and mapping of metadata.

Mapping Component

Choose a suitable mapping from available options

SEM/FIB Tomography Acquisition to TXT

Creates a summary of all metadata extracted from images in a comma delimited txt file. LU: 23.08.2023

Select

SEM/FIB Tomography Acquisition to JSON

Extracts metadata from a SEM/FIB Tomography Acquisition zip file and maps it to the appropriate schema to create a JSON metadata document. LU: 24.08.2023

Select

SEM Zip to txt

Takes a zip folder of arbitrary SEM tiff images and returns a comma separated txt file with a summary of all of the embedded metadata. LU:

Select

SEM to JSON

This plugin is able to handle a variety of SEM images and processes them using the Hyperspy library. A resulting metadata document in JSON format is then created. LU:

Select

Drag & Drop your files or [Browse](#)

[Map document](#)

The landing page of the Mapping Service. The workflow is simply: select the appropriate component (in this case the highlighted one), upload your metadata file(s), and then map the file to obtain the formatted JSON metadata document(s).

```
"instrument": {
  "beamType": "EBeam",
  "spot": "1",
  "eBeam": {
    "accelerationVoltage": {
      "value": "15000"
    },
    "beamCurrent": {
      "value": "1.6e-009"
    },
    "scanRotation": {
      "value": "0"
    },
    "imageMode": {
      "value": "Normal"
    },
    "apertureSetting": {
      "size": {
        "value": "4.53e-005"
      }
    },
    "horizontalFieldWidth": {
      "value": "0.000592"
    }
  }
}
```

This excerpt of the resulting metadata document shows the parameters which correspond to the ones from the example image. This highlights the process of going from unstructured metadata to a structured, machine-workable, and schema-adherent JSON metadata document.

Discover the Mapping Service:

<https://matwerk.datamanager.kit.edu/mapping-service-ui.html>