

CCMX Advanced Course
**“Combining Structural & Analytical Investigations of Matter at the Micro-, Nano
and Atomic Scale”**

5.-8. 11. 2018 ETH Zürich

Station 8

Zeiss NVision 40

(Location: HPK D18)

FIBSEM demo (60 minutes)

Focused Ion Beam Scanning Electron Microscope (FIBSEM) systems are very versatile tools: they allow material analysis as well as preparation of samples for studies by other techniques. This demo will cover in brief the basic setup of the system, the physics of FIB milling and its key parameters, as well as possibilities to analyze a material using FIBSEM or creating a sample for other techniques such as TEM, APT, XCT and mechanical testing.

Dr. Joakim Reuteler

Introduction:

- ✓ Concept of FIBSEM
- ✓ Overview of applications
- ✓ Sample preparation

FIB (specimen: Si wafer):

- ✓ Milling a trench (scan strategy, redeposition)
- ✓ Deposition (carbon layer)
- ✓ Nano-patterning
- ✓ Imaging
- ✓ Artifacts

Cross section and 3d imaging (specimen: Solid Oxide Fuel Cell (SOFC) anode):

- ✓ Protection layer, coarse trench, polishing
- ✓ Tricks for optimal imaging, distortion correction and measurements
- ✓ Acquisition of 3d stacks, reconstruction and segmentation

TEM lamella preparation:

- ✓ Variations of workflow: Wedge technique and H-bar technique
- ✓ Low kV showering

Pillar milling:

- ✓ Requirements for X-ray tomography pillars
- ✓ Requirements for pillars used in micromechanical testing
- ✓ Circular milling and lathe milling