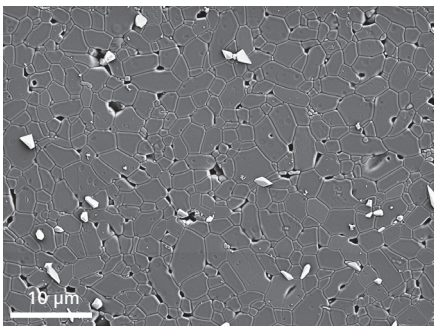


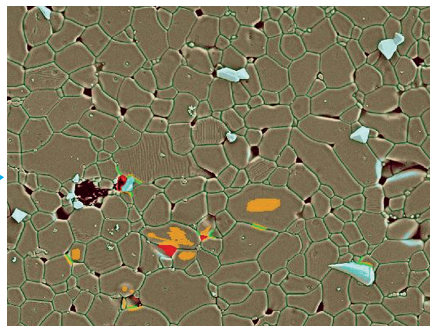


ZEISS ZEN Intellesis for Materials Science

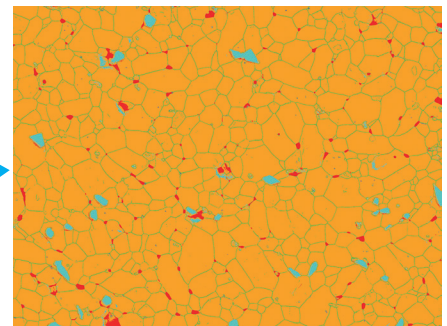
Your Imaging Software for Machine Learning



SEM image of a thermally etched Forsterite ceramic sample. (Sample courtesy: Materials Research Institute, Aalen University)



Manually labeled (enlarged) SEM image for training of a model in ZEISS ZEN Intellesis.



Segmented binary image after applying the trained model (orange: grains, green: grain boundaries, red: pores, light blue: precipitates.)

Perform Advanced Image Processing across Microscopy Methods

Overcome the bottleneck of segmenting your Materials Science images and use ZEISS ZEN Intellesis, a module of the digital imaging software ZEISS ZEN. Independent of the microscope you used to acquire your image data, the algorithm of ZEN Intellesis will provide you with a model for automated segmentation after training. Reuse the model on the same kind of data and benefit from consistent and repeatable segmentation, not influenced by the operator.

ZEN Intellesis offers a straightforward, ease-to-use workflow that enables every microscope user to perform advanced segmentation tasks rapidly.

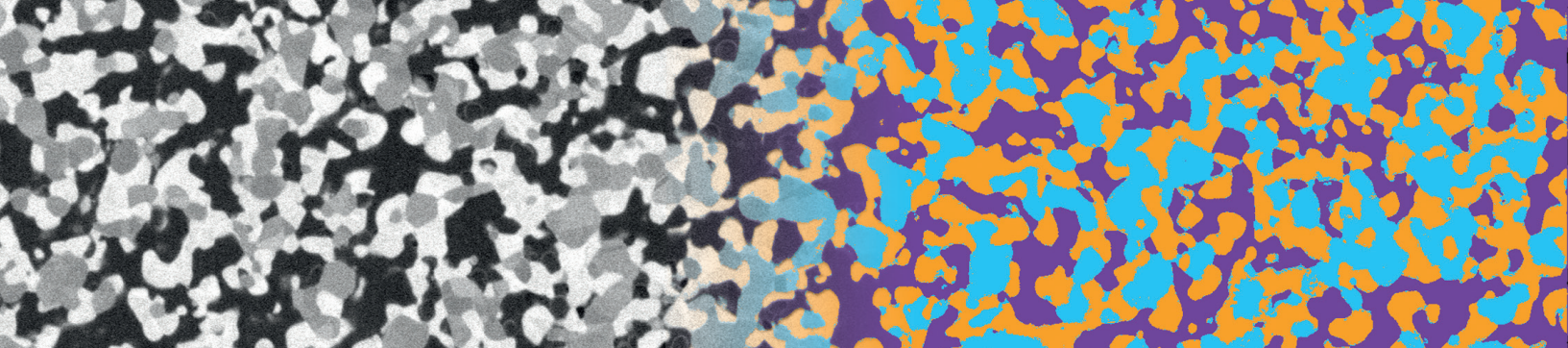
Highlights

- Use powerful machine learning algorithms for pixel-based classification
- Just label objects, train your model and segment your images – there is no need for expert image analysis skills
- Segment any kind of image data in 2D or 3D. Use data from light, electron, ion or x-ray microscopy, or your mobile phone
- Speed up your segmentation task by built-in parallelization and GPU (graphics processing unit) acceleration
- Increase tolerance to low signal-to-noise and artifact-ridden data

ZEISS ZEN Intellesis Features

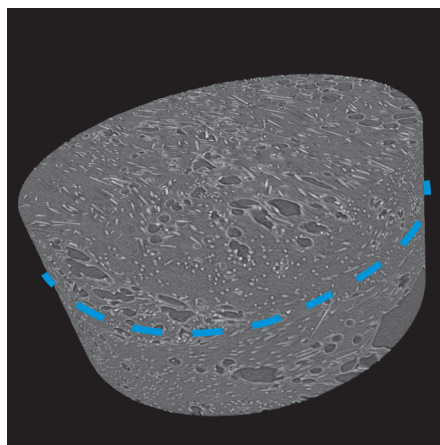
- Seamless integration in ZEN framework and image analysis wizard
- Data agnostic
- Compatibility with 2D, 3D and up to 6D datasets
- Export of multi-channel or labeled images
- Hand-picked default and deep learning feature vectors
- Intuitive training UI
- Exchange and sharing of models
- GPU computing
- Large data handling
- Common and well-established machine learning algorithms



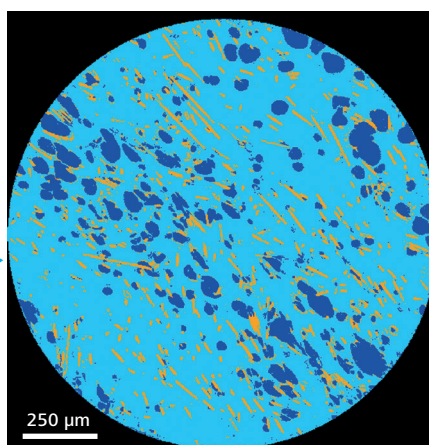


ZEISS ZEN Intellesis for Materials Science

Your Imaging Software for Machine Learning



3D XRM scan of a carbon fiber enforced ABS composite sample. ZEISS ZEN Intellesis has been trained to distinguish matrix, pores and fibers despite the low contrast.



Exemplary slice out of the 3D dataset showing the segmentation result as binary image (light blue: matrix, dark blue: pores, orange: fibers).

Suitable Applications

- Particle analysis
- Volume analysis
- Defect analysis
- Phase analysis

System Requirements

- Installation of ZEISS ZEN
- PC workstation with dedicated graphics card recommended

Facilitate Your Materials Science Image Analysis Applications

ZEISS ZEN Intellesis provides an easy access to rapid and robust image segmentation. Stay focused on tasks like detailed visualization, even in 3D, statistical evaluation or automated analysis and measurements using softwares like ORS Dragonfly, ImageJ, MatLab, etc.

Profit from extracting exactly the data you need: determine number and size of particles on a substrate, estimate the volume fraction of pores or phases, analyze inclusions or precipitates, or measure layer thicknesses. ZEISS ZEN Intellesis enables modelling or simulation where consistent and reliable segmented input data is key.

Image above:

SEM cross-section image of a solid oxide fuel cell anode consisting of pores (black), a ceramic (gray) and a metallic phase (white). Overlaid is the segmentation result by ZEISS ZEN Intellesis (purple: pores, light blue: ceramic phase, orange: metallic phase). Note that the model was able to deal with the different gray levels of the ceramic phase.



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