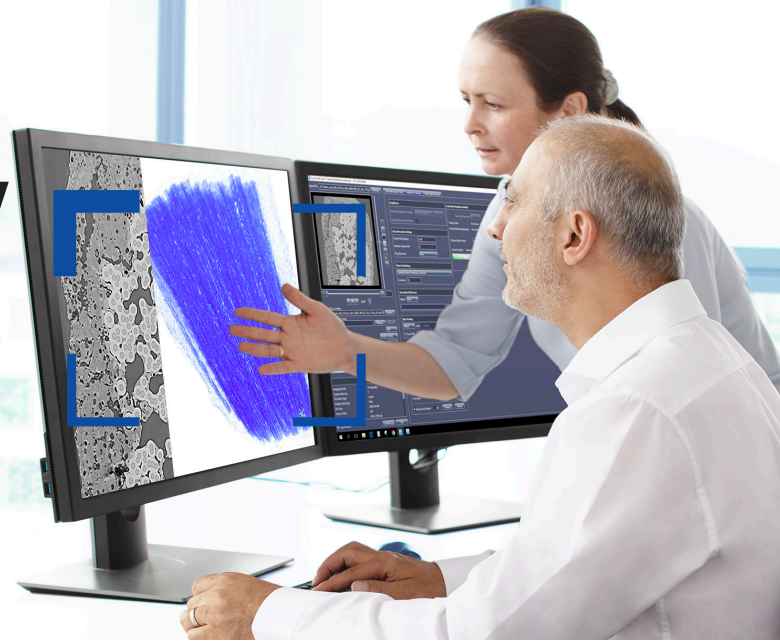# Faster throughput, superior image quality
for academia and industry

ZEISS DeepRecon Pro

Faster throughput by up to 10X

X-ray microscopy can provide unique non-destructive insights into the micro-structure that defines the properties and performance of your devices or materials. Accelerating research by dramatically reducing acquisition times leads to new and far-reaching discoveries and capabilities. In addition, improved throughput can result in faster and more accurate analysis, significantly increasing your return on investment. This is especially valuable in a) repetitive workflows for process development, manufacturing, and quality control b) non-repetitive workflows for

in situ scanning, extreme interior tomographies and high resolution imaging applications.

Better image quality

Achieving the highest image quality and a faster time to results has been a challenge for high-resolution X-ray microscopy. "Noise" is a particular problem, putting extreme demands on the imaging process, and achieving a high signal-to-noise ratio (SNR) can affect throughput. DeepRecon Pro offers statistically improved SNR, greatly reducing X-ray tomographic imaging artifacts and providing superior image quality.
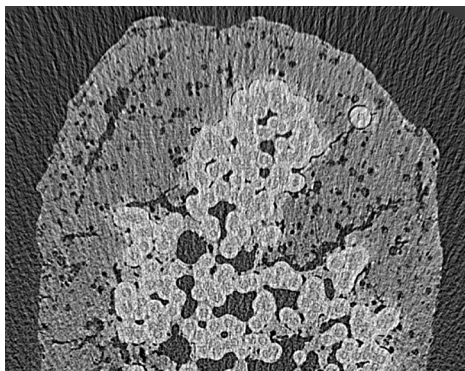
Flexible choices with one-click workflow

DeepRecon Pro uniquely harvests the hidden opportunities in big data generated by your ZEISS X-ray microscope and provides significant AI-driven speed and/or image quality improvements. Now you can enjoy flexibility for your research: speed when your processes demand it and image quality when your research schedule allows it. Customers can self-train new network models on-site with an extremely easy-to-use interface. The one-click workflow of DeepRecon Pro eliminates the need for a machine learning expert and can be seamlessly operated by a novice user.
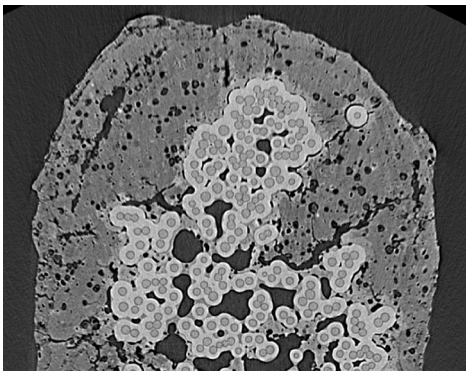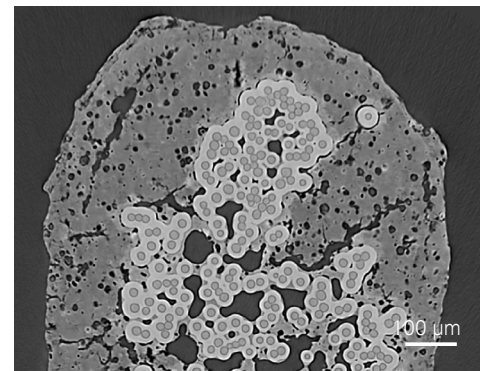
Standard Reconstruction	Standard Reconstruction	DeepRecon Pro
Scan Time: 9 hours	Scan Time: 53 minutes	Scan Time: 53 minutes

DeepRecon Pro used for throughput improvement for Ceramic Matrix Composite (CMC) sample, achieving 10× throughput improvement without sacrificing image quality. This would allow for much higher temporal resolution for in situ *studies.*

Seeing beyond

Applications Examples

ZEISS DeepRecon Pro brings AI to your ZEISS 3D X-ray microscope, offering benefits in a variety of fields, often coming down to improved utilization, faster time to results, and improved return on investment.

■ **Materials Science**

In situ materials testing can greatly benefit from faster imaging, allowing researchers to examine phenomena with more *in situ* test points and gain a more detailed understanding of the mechanisms involved. Higher image quality reconstructions allow materials researchers to push the boundaries of interior volume imaging on deeply buried structures, resolving low contrast features. DeepRecon Pro delivers both accelerated imaging and the best image quality to tackle a range of materials research applications.

■ **Geosciences**

One of the biggest challenges associated with X-ray microscopy is speed. When performing multiscale pore structural analyses, high resolution interior tomographies targeted at specific features can take a long time. Similarly, dynamic *in situ* studies require high temporal resolution. For industrial applications, such as surface exposure analysis in mining, fast time-to-results can enhance system profitability and assist in rapid decision making. DeepRecon Pro enables the extreme throughput that allows breakthroughs in these research fields.

■ **Electronics**

For the routine testing of alignment and material uniformity in devices like camera lens assemblies, machine learning-enhanced reconstruction algorithms can greatly reduce the number of projections needed to get to usable information. DeepRecon Pro can be trained and employed to speed-up the rate of devices that can be tested by a single XRM.

■ **Semiconductor Package**

Interconnect structures are shrinking with higher packing density while packages are growing larger. The end result is smaller, more difficult-to-find defects, and longer analysis times. For failure analysis and quality control applications, DeepRecon Pro enables up to 4X faster throughput by leveraging deep learning networks trained per package type.

■ **Life Sciences**

The ability to observe structure with low contrast and achieve the best image quality are critically important in life science research. Push the boundaries of image quality at the highest 3D resolutions for non-destructive imaging of samples like brain tissue, bone, plants and fixed small animal models. DeepRecon Pro allows life science researchers to obtain faster results from more samples and achieve the optimal image quality needed for their demanding work.

micro@zeiss.com
www.zeiss.com/xrm-reconstruction-technology

Standard Reconstruction
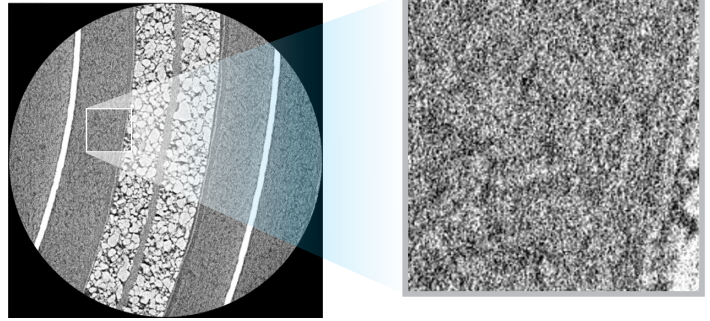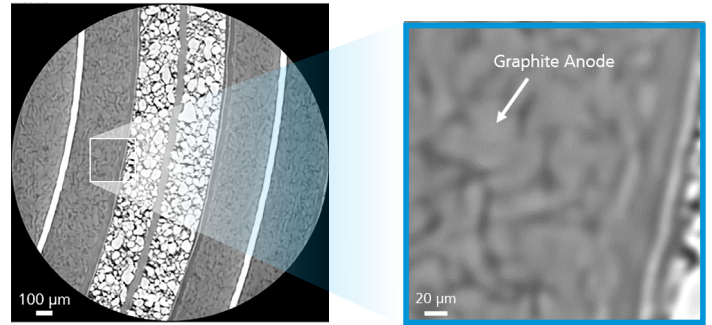
DeepRecon Pro

DeepRecon Pro for image quality improvement: resolve low contrast features like graphite battery anodes with improved image quality.