Object stages for *in situ* examination

• Optional sample mounts

Besides the standard sample holders that are supplied with the system, there are a number of additional optional sample mounts available.

Left: Tube sample holder allows scanning of samples with different sizes, including automated batch scanning or samples in liquid.

Middle: Spider sample holder has four fingers to hold objects of variable geometry and with sizes from 0.8 to 18 mm.

Right: this sample mount contains two layers of parallel tube compartments for four samples up to 5 mm in diameter in each layer for scanning simultaneously.

• Heating and cooling stages

The heating and cooling stages allow micro-CT scanning under controlled object temperature above or below ambient. The heating stage can keep an object at a temperature up to +85°C. The cooling stage can keep an object at sub-zero temperature down to 30-40°C below ambient. An internal microprocessor controls a dual-stage solid-state Peltier cooling or heating system and stabilizes object temperature with < 1°C accuracy.

Like other stages for in-situ examination, cooling or heating stages are powered and controlled through a small connector at the top of the object stage. The power and control signals are connected to the static part of the scanner through special gold contact slip rings with low friction and high reliability in endless rotation.

• Material testing stage

The material testing stage (MTS) applies controlled compression or tension to an object, while having a design which allows tomographic scanning while applying force. An internal microprocessor controls the loading mechanics and the readout of applied force and displacement. The loading curve is displayed on-screen in real time. An object can be held under specific load(s) during one or more micro-CT scans.

Maximum object diameter for MTS is 20mm, maximum length for compression is 23mm, for tension - 18mm. Travel range is 5.5mm. The material testing stage can be supplied with different load cells for maximum compression or tension force of 42, 210 or 440N.

Cover Image:
Volume rendering of a triphosphate scaffold using CTVox,
Scanned with SkyScan 1172 at 3.5µm pixel size
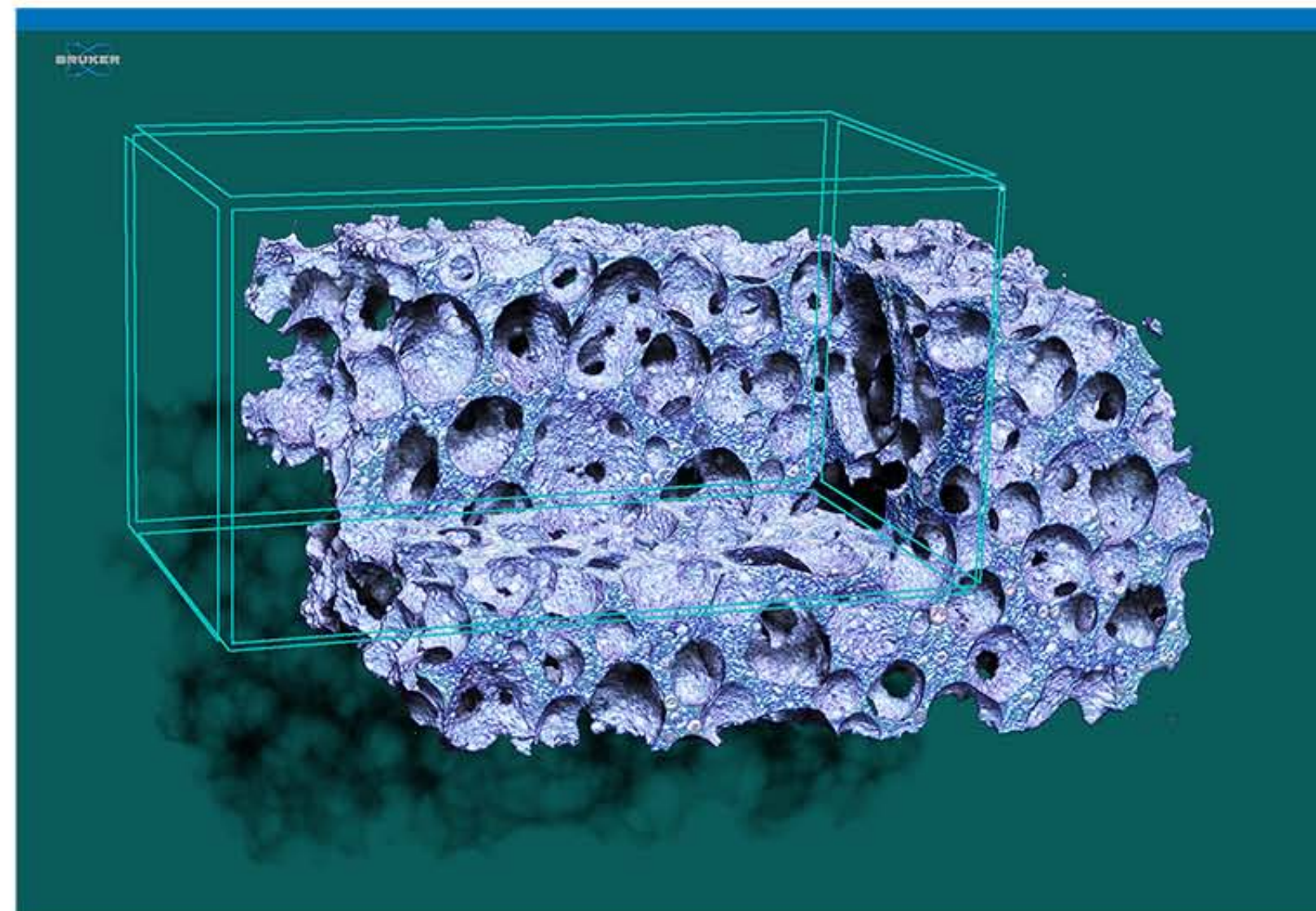
To connect to the **Bruker microCT** website **bruker-microct.com**, scan this QR-code by camera in your mobile phone or iPad.

Free QR-code readers are available on the AppStore or Google play.

www.bruker.com • **Bruker microCT**

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info.BmCT@bruker.com
sales.BmCT@bruker.com

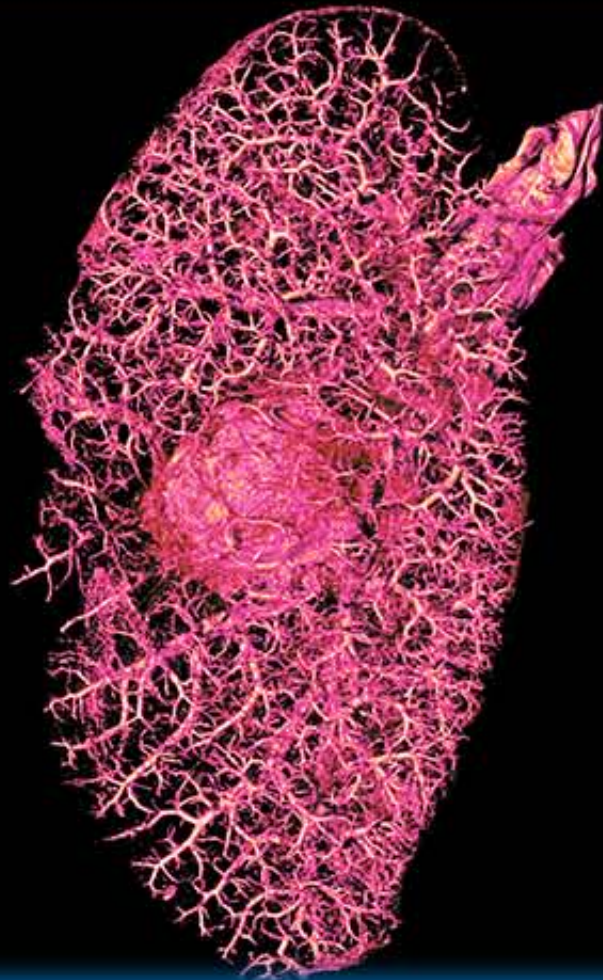Sales representative:

Bruker microCT

• High-Resolution X-Ray Microtomography
Life Science Applications

Innovation with Integrity

Microtomography

SkyScan 1272
High Resolution Desktop Microtomograph

SkyScan 1173
High-Energy Microtomograph

Volume rendering of the mouse lung vasculature with central tumor, scanned at 10µm pixel size

Volume rendering of a 31 mm human bone, scanned at 10µm pixel size, 55kV

- More than 200 Megapixel (14450 x 14450 pixels) in every virtual slice through objects,
- Nominal resolution 0.35µm with a 16Mp X-ray camera, or 0.45µm with a 11Mp X-ray camera,
- World's fastest hierarchical 3D reconstruction: InstaRecon®, with 20x…100x speed-up,
- Automatically variable acquisition geometry for shortest scan at any magnification,
- 20-100kV maintenance-free X-ray source, 6-position automatic filter changer,
- Scanning diameter up to 75mm, integrated micropositioning stage,
- Software suite for 2D/3D image analysis, task lists, user plug-ins, and surface/volume rendering,
- Optional 16-position sample changer with auto adjustment of magnification and scanning protocol

- 5µm resolution, spiral scan with no ring artifacts or partial scan connections,
- Object diameter up to 140mm, integrated micropositioning stage,
- 130kV maintenance-free X-ray source, distortion-free 5Mp flat panel detector,
- GPU-accelerated 3D reconstruction, more than 17Mp in every slice,
- Software suite for 2D/3D image analysis, task lists, user plug-ins, and surface/volume rendering,
- Optional World's fastest hierarchical 3D reconstruction: InstaRecon®

SkyScan 1174

Compact Microtomograph

SkyScan 2211

Multi-scale Laboratory Nanotomograph

structure thickness
53μm — 905μm

structure separation
53μm — 905μm
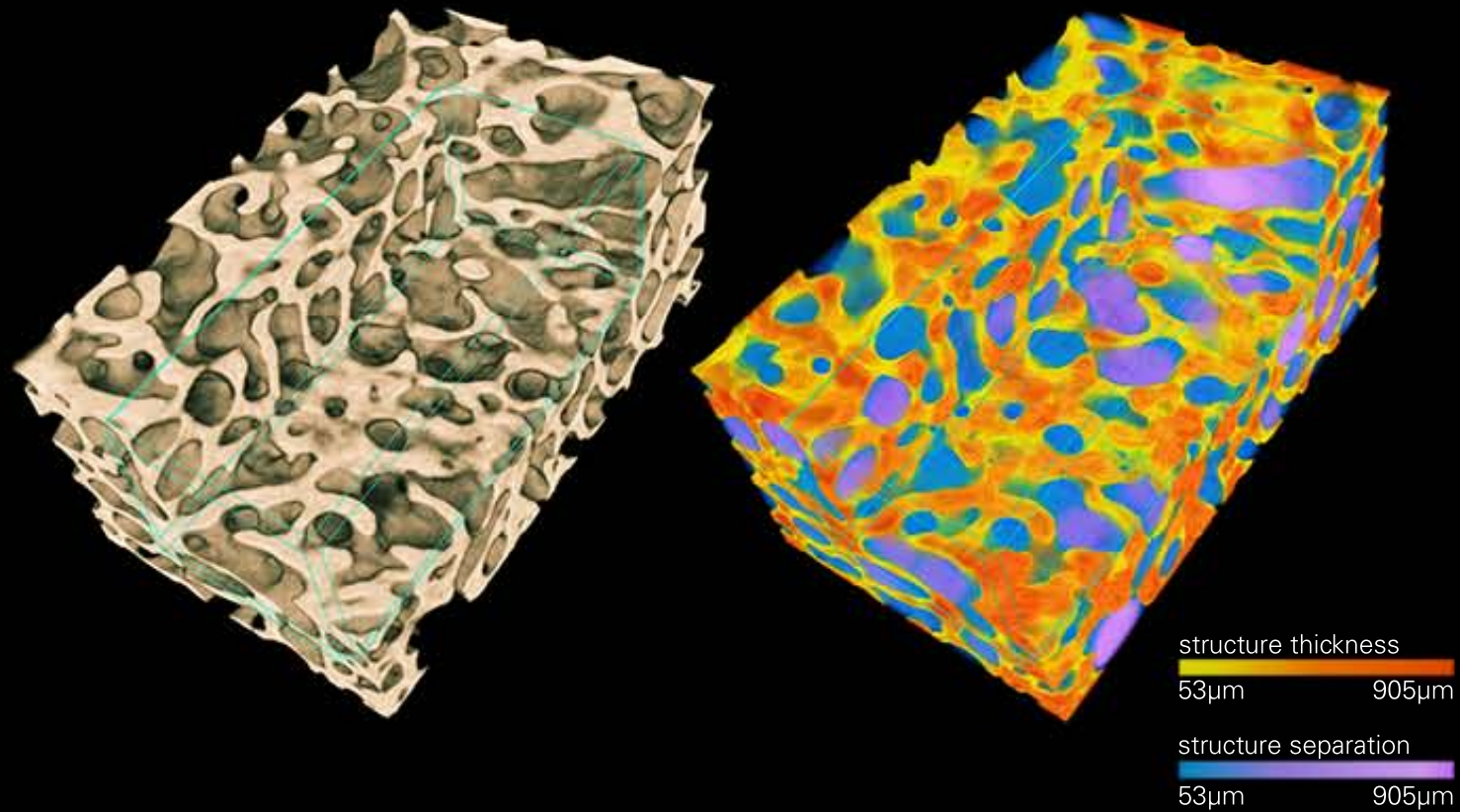
Volume rendering of a rat bone (left)
and 3D morphometric analysis (right)
scanned at 26μm pixel size

Volume rendering of a sheep distal femoral
condyles with two titanium screw implants,
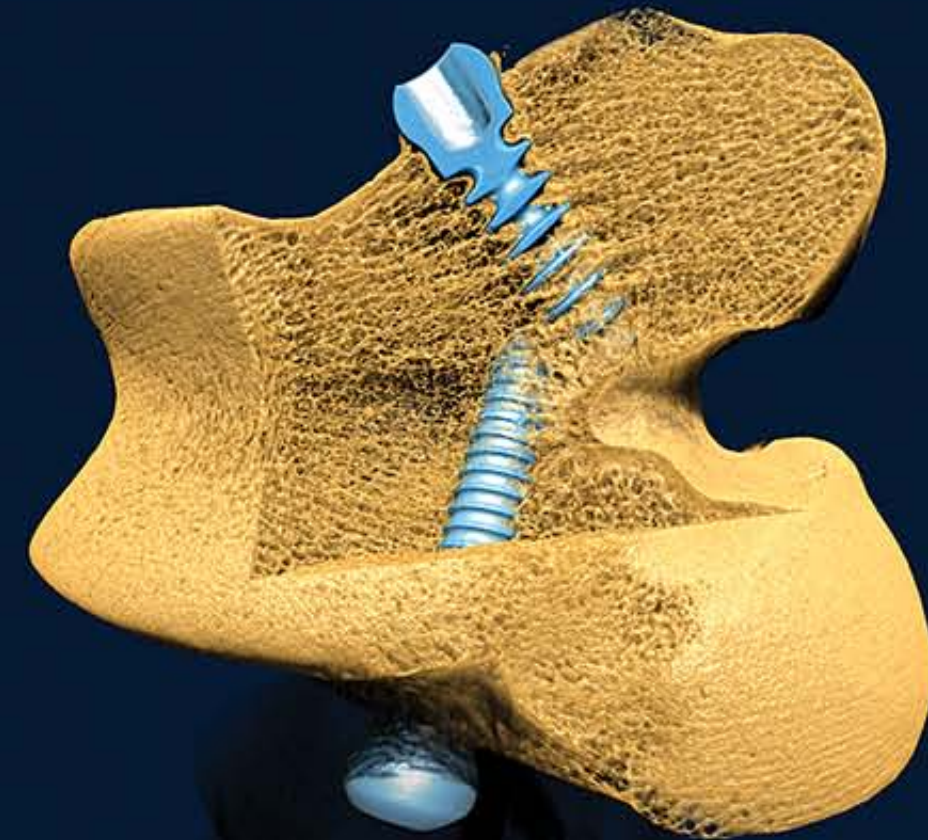scanned at 37μm pixel size, 170kV

At a fraction of the price of competitive systems, with a small footprint,
SkyScan1174 provides fast, high resolution 3D imaging with exceptional quality.

- Fast scanning with simple scanner operation,
- Down to 6 micron 3D detail detectability,
- 50kV maintenance-free X-ray source,
- Cooled 1.3Mp 14-bit X-ray camera,
- GPU-accelerated reconstruction,
- Software suite for 2D/3D image analysis, task lists, user plug-ins, and surface/volume rendering

- Up to 8000x8000 pixels in every virtual slice, up to 2300 such slices can be reconstructed after a single scan,
- Object size up to 204mm in diameter, submicron resolution for small samples, 100nm nominal resolution,
- World's fastest hierarchical 3D reconstruction: InstaRecon®, with 20x...100x speed-up,
- Integrated micro-positioning stage with piezo-drives,
- Two X-ray detectors: 3Mp flat-panel + 11Mp cooled CCD,
- 20-190kV X-ray source, 3Mp flat- panel sensor + 11Mp cooled CCD camera to cover wide range of magnifications,
- Precision air-bearing rotation with <50nm accuracy for objects up to 25 kg weight,
- Integrated anti-vibration natural granite platform with pneumatic leveling,
- software suite for 2D/3D image analysis, task lists, user plug-ins, and surface/volume rendering

SkyScan 1176

High Resolution *in-vivo* Microtomograph

Software suite

Reconstruction, Analysis and Realistic Visualization

Above:
Full body scan of a mouse with contrast agent, scanned at 35μm pixel size.

Below:
In-vivo 9μm pixel size scan of mouse knee with virtual cut through the femur and tibia allowing cortical and trabecular structural 2D and 3D analysis.


- • <9μm detail detectability in full body *in-vivo* mouse and rat scanning and distal limb scanning for bigger animals,
- • Up to 8000x8000 pixels in every reconstructed slice for all object sizes up to 68mm in diameter and 200mm in length,
- • Integrated physiological monitoring: movement detection, breathing, ECG,
- • 4D (time-resolved) microtomography of heart beat and breathing,
- • World's fastest hierarchical 3D reconstruction: InstaRecon®, with 20x…100x speed-up,
- • Software suite for 2D/3D image analysis, task lists, user plug-ins, and surface/volume rendering

• NRecon:
Multithreaded GPU-accelerated Reconstruction

NRecon achieves the world's fastest large format reconstruction. It runs on a single PC or a cluster of several PCs. The reconstruction uses a unique parallelization algorithm for GPU-acceleration on single or multiple graphical cards. It supports beam-hardening correction, misalignment correction, ring artifact elimination, volume of interest reconstruction and reconstruction of objects larger than field of view, automatic merging partial scans, drift compensation and many other options.
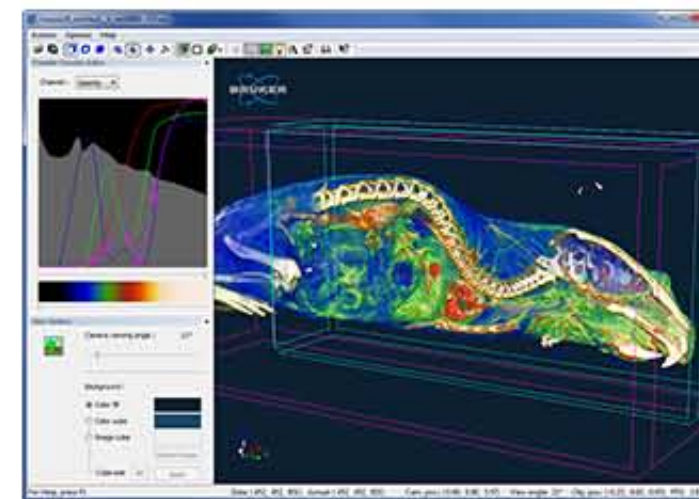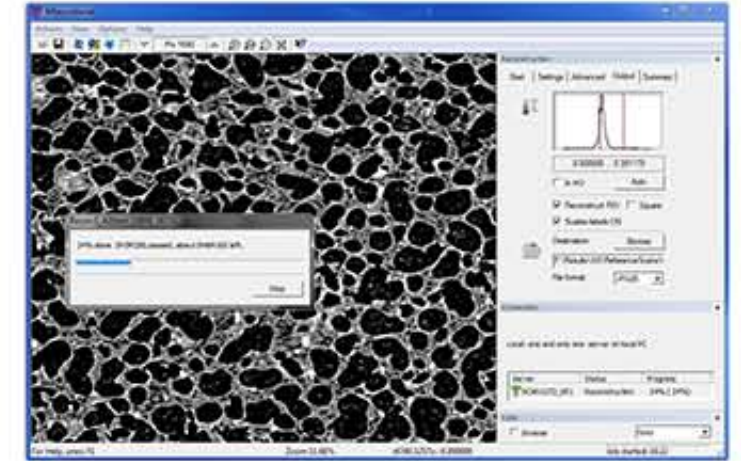
• CTVox:
Realistic Visualization by Volume Rendering

The volume rendering program CTVox displays a set of reconstructed slices as a realistic 3D object with intuitive navigation and manipulation of both object and camera, a flexible clipping tool to produce cut-away views, background selection including custom scenery and an interactive transfer function control to adjust color and transparency. The lighting and shadowing options combined with selection of properties of the material surfaces allow fully realistic visualization. A "flight recorder" function allows fast creation of animations based on the selection of several key frames with automatic interpolation in between. Imaging possibilities include stereo viewing using glasses with color filters. Any 3D results can be exported to iPhone, iPad or Android mobiles for volume rendering and virtual cut.

• CTAn:
2D / 3D Image Analysis and Processing
• CTVol:
Realistic Visualization by Surface Rendering

CTAn or "CT-Analyser" allows accurate and detailed study of micro-CT results for morphometry and densitometry. Powerful, flexible and programmable image processing tools allow a wide range of segmentation, enhancement and measurement functions. CTVol or "CT-Volume" uses surface triangulated models from CTAn and provides a virtual 3D viewing environment, flexible and rich in features, to give you a wide range of options for 3D presentation of micro-CT results.