



## *CT-analyser and CT-volume*

### **CT-Analyser builds 3d models from micro-CT scans and measures comprehensive 2d and 3d morphometric parameters, plus density**

SkyScan “CT-analyser” allows accurate and detailed study of micro-CT datasets for morphometry and densitometry. It is an intuitive and comprehensive environment for processing and analysis, generating the quantitative data that is the final objective of micro-CT imaging. Powerful, flexible and programmable image processing tools allow a wide range of segmentation and selective image enhancement functions for analyses ranging from porosity to contact surface around high-density insertions to complex topologies and architectures. Highly versatile region/volume of interest selection tools are a key component of this 3D image analysis environment.

The software features include:

- Import and output of dataset in tiff, bmp, jpg
- Angular resampling of datasets to any solid angle
- Advanced region and volume of interest (ROI, VOI) selection tools
- Measures 3D distances and angles
- Creates maximum intensity projection (MIP) images
- Calibrates and measures density as HU, BMD or attenuation coefficient
- Image processing functions such as smooth, despeckle, morphological operations etc.
- Switch between general scientific and bone morphometry (ASBMR) parameter names
- Programmable stacking of functions (“scripting”) for customised and automated analysis
- Analysis of integrated structures within VOI in 2D, 3D
- Analysis of all individual objects within ROI/VOI in 2D, 3D
- Parameters measured (including 2D and 3D):
  - Object (pore, particle, etc.) or “bone” volume
  - Object or “bone” surface
  - Structure or “trabecular” thickness
  - Structure or “trabecular” separation, number
  - Structure Model Index (SMI)
  - Fragmentation index or “trabecular pattern factor”
  - Euler number

- Degree of anisotropy by MIL, eigenvalues, eigenvectors and stereology
- Fractal dimension (Kolmogorov)
- Moments of inertia (x, y, polar, product), Eccentricity
- Cortical periosteal perimeter (outer perimeter of tube)
- Cortical endosteal perimeter (inner perimeter of tube)
- Detailed analysis of porosity
- Automated batch analysis
- Measurements validated by real and virtual phantoms
- Creates 3D models by several rendering algorithms, in formats including STL

## **CT-Volume and CT-Voxel provide a virtual 3D viewing environment, by surface and volume rendering respectively**

A virtual 3d viewing environment is provided which allows:

- Surface rendering (Marching cubes, adaptive) by CTVol, volume rendering with CTVox
- Maximum intensity projection (MIP) and virtual projection 3D imaging modes (CTVox)
- Movement and rotation of single and multiple object models
- Selection of viewing angle (wide-narrow angle perspective)
- Model movements by mouse or selected angular and translational increments
- Control of object texture, colour, lighting, transparency
- Transfer function texture control in CTVox retaining density structure of original images
- Control of direction of lighting and surface lighting effects
- Saving of object texture, colour, lighting, transparency for future reloading
- Selection of background colour including scenery
- Cut models along one or more selected planes to reveal internal structure
- A “clipping” tool in CTVox to restrict display to a selected volume (cube, cylinder, wedge, sphere, etc.)
- Resampling / interpolation of a dataset in any planar 3D orientation
- Bounding box with scale marks provided
- Semi-automated creation of animated “movies”.