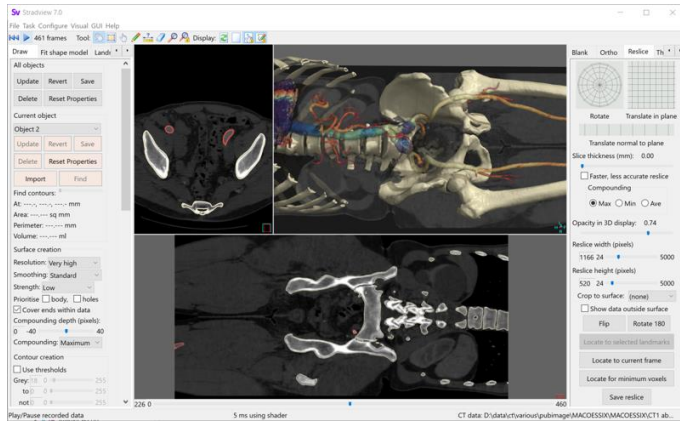


# Stradview

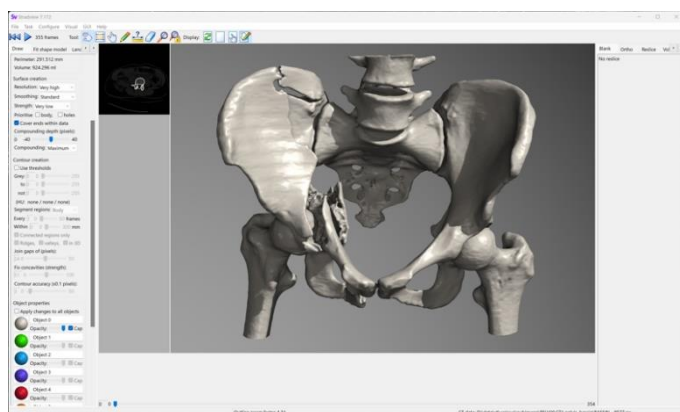
Visualisation and analysis of 3D imaging data.

<http://mi.eng.cam.ac.uk/Main/StradView>



## Concept

- **Practical:** makes very efficient use of memory and graphics power and is highly optimised. It can hence process large data sets (e.g. microCT) as well as smaller ones (e.g. medical) quickly even on fairly standard computers.
- **Accurate:** sub-pixel and sub-voxel resolution is preserved throughout all of the analysis and visualisation.
- **Targeted:** for visualising and analysing individual 3D (cross-sectional) data sets. Doesn't do everything: but does what it does well.
- **Fine control:** the interface is carefully designed, but all useful options are exposed to the user.
- **Unique:** all features are designed and written in-house, not using third-party libraries.

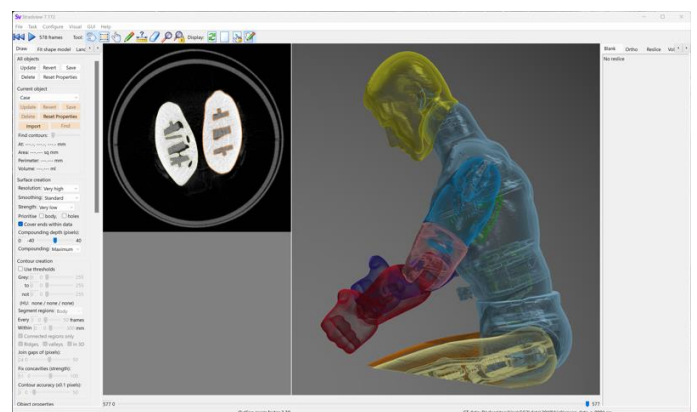


## Create surfaces from 3D data

- Surfaces always derived via contours in the original data which can be manually edited even if they were created automatically.
- Automated level-of-detail to ensure the minimum number of contour points for editing whilst maintaining accuracy. Deletion and selection of contours in 2D and 3D.
- Surfaces created from contours contain very regular triangles (*Regularised Marching*

*Tetrahedra*), with triangle size independent of contours, and the capability to interpolate between very sparse contour sets.

- Automated extraction to multiple objects using data thresholds, but with tools to allow for sub-threshold thin features and gaps in 3D, and concavity detection and removal.
- Sub-pixel and sub-voxel accuracy throughout this process, in contrast to surfaces based on classifying voxels.
- Import objects from NIfTI and DICOM files and surfaces from PLY files, and export intersections and surfaces to PLY, NIfTI and NRRD label data.
- Also includes features for segmenting surfaces using prior shape models.
- Drawing directly on surfaces to extract patches / cut parts out for further analysis.

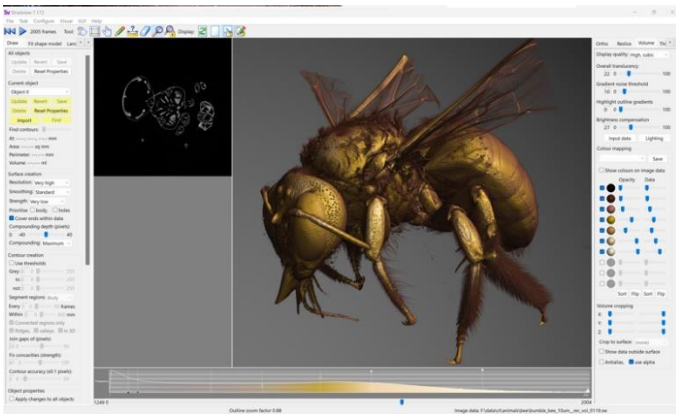


## Visualise surfaces

- Includes advanced features such as ambient occlusion, soft and coloured translucent shadowing, and material anisotropy.
- A 'clear' visualisation which clearly highlights internal features within complicated surfaces.
- Correct translucency even for complicated, multiple overlapping surfaces.
- Dynamic intersections with all data reslices.

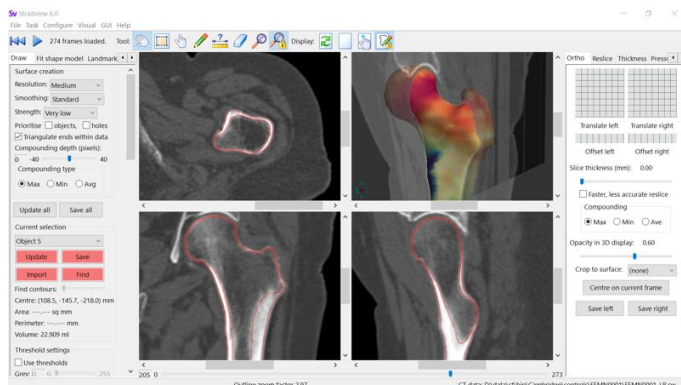
## Volume rendering

- High quality realistic visualisations, better than normally available on basic hardware, including radiant and ambient shadowing, point lights and various material properties.
- Very accurate, using real time cubic interpolation of data.
- Fast and efficient, can run on a fairly minimal graphics card, reducing resolution automatically if the memory is limited.
- Volume rendering can be cropped to completely arbitrary surfaces, with sub-voxel accuracy.
- A 'clear' visualisation (as for surfaces) shows internal features very well.
- Mixed volume rendering / surface visualisations.



## Analyse data over surfaces

- Including *Cortical Bone Mapping*, the only software which implements this technique.
- Advanced features for extracting very thin (sub-resolution) laminar surfaces from data.
- Can be used to create accurate geometry from thin surfaces.
- Can be used to map thin surface features (e.g. thickness / density) to the surface for visualisation or later statistical analysis.
- Can also directly map imaging data (min / max / average over a range) to the surface, which allows segmentation on surfaces.



## Reslice imaging data

- Can generate accurate cross-sectional images (reslices) in any orientation.
- Thick slab reslices are also possible for e.g. maximum intensity projections.
- All reslices can be cropped to completely arbitrary surfaces.

## Measurements

- Landmark placement on imaging data, reslices, surfaces or even volume visualisations.
- Allows measurement of location, distance and angles, and noting reference points.
- Export of this and summary surface information (volume, cross-sectional areas, centres, etc) to external files.

## Data handling

- Design for minimal memory use allows loading and realistic processing of even large (>8Gb) data sets.
- Can read many different data formats, including DICOM, Mindways QCT, ITK, Analyze, NIfTI, NRRD and many 2D image formats.
- Can be used to take cross-sectional image sequences without any 3D locations and create 3D data from these, including when it is not on a regular grid, e.g. irregular spacing or fan-scans.
- Can export irregular 3D data to regular 3D resliced data, and regular data to NIfTI and NRRD formats.
- Can export data to sequences of cross-sectional 2D images and visualisations to images.
- Many functions can be scripted, allowing automated processing and the creation of still image sequences for movies.

