

SOFTWARE FOR 3D IMAGE VISUALISATION,
ANALYSIS AND MODEL GENERATION



SIMPLEWARE SOFTWARE

Simpleware provides easy-to-use software solutions for the processing of 3D image data from sources including MRI, CT, micro-CT and confocal microscopy. A modern and intuitive interface allows users to quickly visualise and inspect image data, and to apply a wide range of segmentation tools and filters to extract Regions of Interest (ROIs). Interactive measurement tools and in-depth statistics templates can also be used to obtain quantitative information from image data. Segmented images can then be prepared for export as models and meshes for further analysis in design and simulation packages. Options are also available for integrating CAD geometries with image data, enabling evaluation of implant designs and the placement of stents.

Free, fully supported trial versions are available at www.simpleware.com.

SIMPLEWARE SERVICES

Simpleware provides complete services for converting your 3D image data into a variety of models and meshes. These exports can be tailored to your exact requirements, with applications for physics-based simulation and 3D printing. Alternatively, if you do not currently have your own image data, we can generate models from our in-house MRI and CT datasets. Contact us to arrange a data transfer and to discuss your requirements with one of our engineers. Off-the-shelf human body models are also available on our sister site www.humanbodymodels.com.

SIMPLEWARE SUPPORT & TRAINING

Simpleware prides itself on the high level of personalised technical support it provides to customers by email, phone and web meetings. We also offer customised on-site training, workshops and webinars. Visit our website for the latest events, or contact us to request a tutorial from one of our qualified application engineers.

BIOMECHANICS

- » Visualise and analyse complex anatomical structures
- » Link patient-specific image data with musculoskeletal modelling systems
- » Generate meshes for simulating interaction between products and the human body

ORTHOPAEDICS

- » Rapidly export accurate models for additive layer manufacturing
- » Integrate implants with patient-specific anatomies
- » Export multi-part FE meshes for implant validation and contact mechanics analyses
- » Define Hounsfield-based material properties

PHYSIOLOGICAL FLOWS

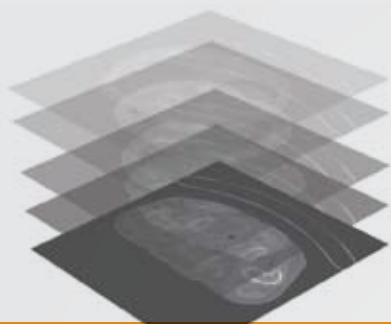
- » Visualise and measure cardiovascular networks
- » Import and position CAD-based geometries such as stents
- » Generate high quality simulation-ready CFD meshes for further analysis

DENTAL

- » Import CBCT scans for segmentation and quantification
- » Integrate CAD implants into image data to determine optimum positions
- » Generate NURBS-based CAD models for further implant design work

FROM IMAGE PROCESSING THROUGH TO MODEL GENERATION

Core Software ScanIP



IMPORT

Modalities

- » MRI
- » CT
- » Micro-CT
- » Ultrasound
- » Confocal microscopy

Formats

- » DICOM
- » 2D image stacks (BMP, JPEG, TIFF...)
- » Raw image data



VISUALISATION

Volume rendering

- » Fast and memory efficient
- » GPU rendering
- » Interactive histogram and colour mapping
- » Presets and “auto set”

Mask rendering

- » Render segmented masks
- » Clipping and opacity settings
- » 3D stereo mode options



IMAGE PROCESSING

Image and mask filters

- » Noise reduction
- » Smoothing and morphological filters
- » Wide range of image transforms

Automated/manual segmentation

- » Region growing and magnetic lasso
- » Threshold, floodfill and painting
- » 3D editing tools

EASY-TO-LEARN AND USE

ScanIP provides an intuitive user interface for processing 3D image datasets. A ribbon design allows key tools to be found quickly and efficiently, while still providing access to an extensive range of processing options. The software also comes with a comprehensive set of easy-to-follow tutorials. In addition, our team of support engineers are available to provide assistance to streamline your workflow.

IMPORT AND EXPORT MULTIPLE FORMATS

ScanIP is compatible with a wide range of image data from different modalities, including MRI, CT, micro-CT, confocal microscopy and scanning electron microscopy (SEM). Dedicated import options are provided for DICOM, stacks of images, or raw images. Models generated using the Simpleware software suite can be directly exported to leading physics-based solvers, CAD packages and 3D printing services without the need for any further processing.

FROM IMAGE PROCESSING THROUGH TO MODEL GENERATION



MEASUREMENTS

Interactive tools

- » Points, distances, angles...
- » Quick access measurements and statistics
- » Use ROIs for localised measurements
- » Available in 2D and 3D

Image statistics framework

- » Extensive range of statistics
- » Includes orientations and connectivity statistics
- » Build analysis specific templates

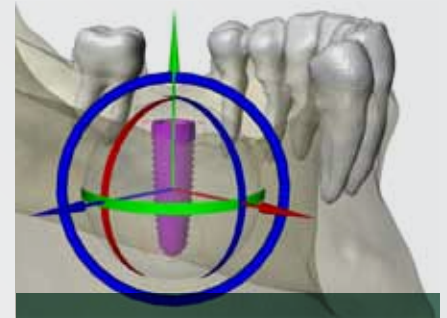


SURFACE MODEL/MESH

Surface mesh generation

- » Volume and topology preserving smoothing
- » High quality triangulations
- » Guaranteed watertight surfaces
- » Conforming multi-part surfaces
- » Range of surface mesh exports
- » Models ready for 3D printing

+CAD Module



CAD INTEGRATION

- » Fast and easy-to-use tools to combine CAD with image data
- » Import CAD files (STL, IGES, STEP...)
- » Interactive positioning
- » Robust Boolean operations
- » CAD primitive generation
- » Internal structures for 3D printing

GENERATE HIGH QUALITY MODELS

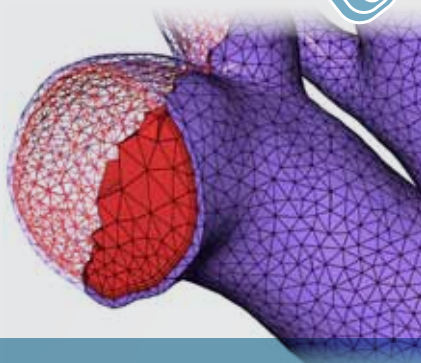
Surface meshes created in ScanIP automatically provide fully watertight triangulations, ensuring complete compatibility with 3D printing systems. Volume meshes can be created with the +FE module using a choice of meshing algorithms and can include contacts, nodes, shells and material properties. In addition, both surface and volume meshes automatically handle multiple segmented regions where interfaces have shared (or coincident) nodes. Alternatively, NURBS patches can be fitted using the +NURBS module, allowing image-based models to be further analysed in CAD packages.

CUSTOMISE YOUR WORKFLOW

A scripting API allows access to all options within the software and provides support for a range of languages, including Python, C# and Java. With this functionality, you can automate repeatable operations, build wizards and integrate your own plugins. Script creation is also possible through macro recording and by converting log history entries. In addition, an interface with MATLAB® allows for the further integration of custom filters and algorithms.

FROM IMAGE PROCESSING THROUGH TO MODEL GENERATION

+FE Module



FE/CFD VOLUME MESH

Volume mesh generation

- » Conforming multi-part volume meshes
- » Feature-based and user-defined mesh refinement
- » Define contacts, node sets and shells
- » Hounsfield material mapping for FE exports
- » Boundary layer meshing for CFD
- » Dedicated exports for major solvers

+NURBS Module



NURBS/CAD MODELS

- » Automated NURBS patch fitting
- » Choice of algorithms
- » Highly accurate conversion
- » Inspection tool to check models
- » Models suitable for further design work/simulation
- » Export to SolidWorks, AutoCAD, CATIA, Pro/Engineer...

STREAMLINE BIOMEDICAL IMAGE PROCESSING

Biomedical researchers can streamline their workflows by using a single integrated environment for visualising, processing, analysing, quantifying and meshing medical images. Save time when working with your images and generate highly accurate models with minimal effort. In addition, the software provides a unique solution for integrating CAD models into your image data, enabling straightforward implant validation and multi-part mesh generation. Simpleware software provides a comprehensive solution for accurately generating anatomies for biomechanical, orthopaedic, cardiovascular and dental applications.


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SOFTWARE IS:

- » User-friendly
- » Accurate
- » Robust
- » Flexible
- » Reliable

PROCESS DATA FROM:

- » CT and MRI
- » Ultrasound
- » Micro-CT and nano-CT
- » Confocal microscopy
- » Scanning electron microscopy
- » Serial sectioned images

USERS CAN:

- » Import any stacked image set
- » Rapidly visualise and quantify image data
- » Segment Regions of Interest (ROIs)
- » Obtain measurements and statistics
- » Integrate CAD objects with 3D images
- » Generate multi-part models from arbitrarily complex topologies
- » Easily convert 3D images into surface/volume meshes
- » Export models to CAD/FE/CFD packages and for 3D printing
- » Automate workflows by recording and running scripts

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About Simpleware

Simpleware develops industry-leading image processing software solutions for 3D image visualisation, analysis and model generation.

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