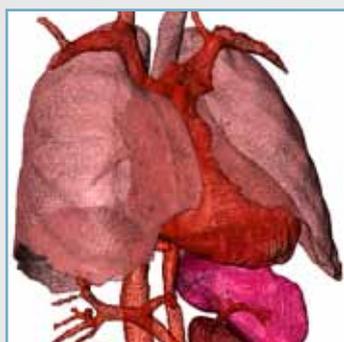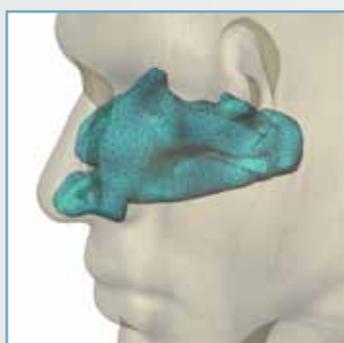**simpleware**

SIMPLEWARE FOR ANALYSING PHYSIOLOGICAL FLOWS

Simpleware provides comprehensive software solutions for reconstructing cardiovascular and airway geometries from image data (MRI, CT, micro-CT...). Images can be visualised, measured and exported as high quality computational models suitable for physiological flow analysis within Computational Fluid Dynamics (CFD) solvers. In addition, the software provides the capability to integrate CAD-designed medical devices with image-based models, creating the potential to generate patient-specific models.

From Image to Model in Minutes

Simpleware software offers an intuitive interface for processing 3D image datasets from a wide range of scan modalities. Find tools quickly and efficiently using a ribbon design, and make use of a comprehensive set of easy-to-follow tutorials when learning the software. Full technical assistance on image processing and meshing is also available from our team of support engineers.

Automate your Workflow

It is possible to customise Simpleware software to meet your specific workflow needs. A scripting API allows access to all options within the software and provides support for a range of languages, including Python, C# and Java. This functionality enables you to automate repeatable operations, build wizards and integrate your own plugins. Script creation is also possible through macro recording.
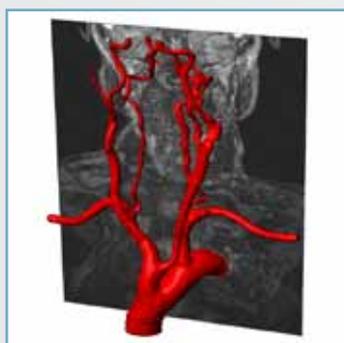

Key Features and Benefits

» **Intuitive user interface:**
   easy-to-learn and easy-to-use

» **Import 3D image data of any scale:**
   MRI, CT, micro-CT, microscopy...

» **Advanced 3D image processing tools:**
   visualisation, segmentation, analysis...

» **Comprehensive measurements and statistics:**
   measure airways and vessels

» **Integrate CAD and image data:**
   combine medical devices and patient data

» **Conforming multi-part meshing:**
   automated, robust, fast, simulation-ready

» **Optimise models for CFD:**
   boundary layers, custom inlets/outlets...

» **Established solver compatibility:**
   direct export for all leading CFD solvers

VISUALISATION AND IMAGE SEGMENTATION

Simpleware software enables 3D medical data to be rapidly visualised and processed. Reconstruct vessels and airway geometries from 2D image stacks, and employ semi-automated segmentation and 3D editing tools when working with data. Proprietary smoothing tools can also be used to improve model accuracy, while measurements and statistics can be obtained through user-defined and built-in templates.

» Rapidly segment arteries and airways using a variety of tools

» Use 3D editing to interactively generate and edit models

» Remove unwanted artefacts and smooth data without compromising features and connections

» Obtain measurements of airways and vessels and place landmark points for further analysis
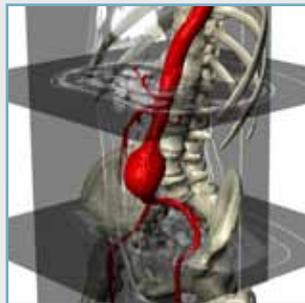
INTEGRATE CAD DEVICES WITH IMAGE DATA

Cardiovascular and airway geometries can be combined with CAD-designed medical devices such as stents using Simpleware software. Position CAD parts within segmented image data for device inspection and measurement, and export multi-part STLs or volume meshes for further analysis in CFD solvers. Avoid working with image-based data in CAD programs and streamline the generation of multiple meshes for testing surgical variability.

» Integrate CAD objects with patient-specific data

» Export multi-part models for CFD analyses

» Save time when working with CAD parts and image data
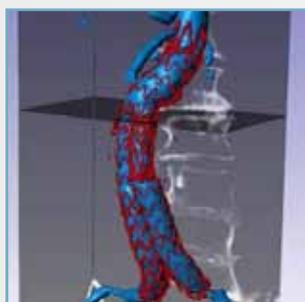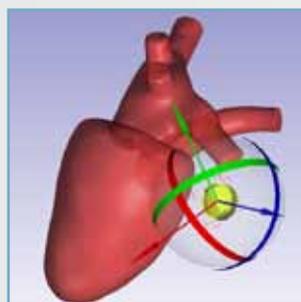
MULTI-PART MESHING FOR CFD

Simpleware software provides industry-leading meshing algorithms for converting segmented medical data into robust multi-part models for Computational Fluid Dynamics (CFD) analyses. Generate meshes with conforming interfaces and shared nodes, and assign boundary conditions to image data. Options are also available for meshing boundary layers and adding custom inlets and outlets to models, enabling accurate analysis of patient-specific fluid and air flows in solvers.

» Define boundary conditions and material types (walls, velocity inlets, pressure outlets...)

» Mesh boundary layers by generating prism cells close to solid boundaries

» Generate custom inlets and outlets using mesh clipping planes

» Export meshes to all leading CFD solvers

» Produce additional STL files for 3D printing
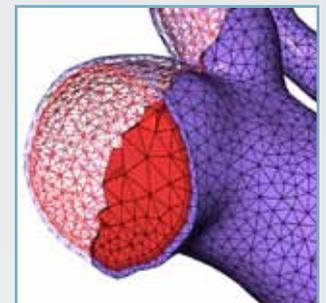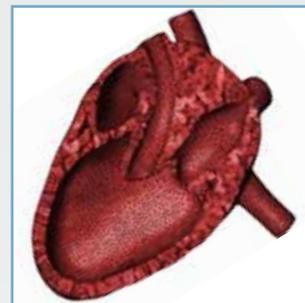
RECENT APPLICATIONS

Simpleware software has been used to process image data for a wide range of projects involving physiological flows. For example:

» Evaluating cerebral aneurysm risk through CFD models and fluid-structure-interactions

» Characterising the functionality of complex vascular networks

» Comparing blood velocity measurements

» Analysing the impact of calcification and intraluminal thrombus on the computed wall stresses of an abdominal aortic aneurysm

» Modelling airflow and particle transport/deposition in pulmonary airways

Visit our website for a fully functional 30-day free trial. Trial versions are fully supported by our technical team.

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

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www.simpleware.com