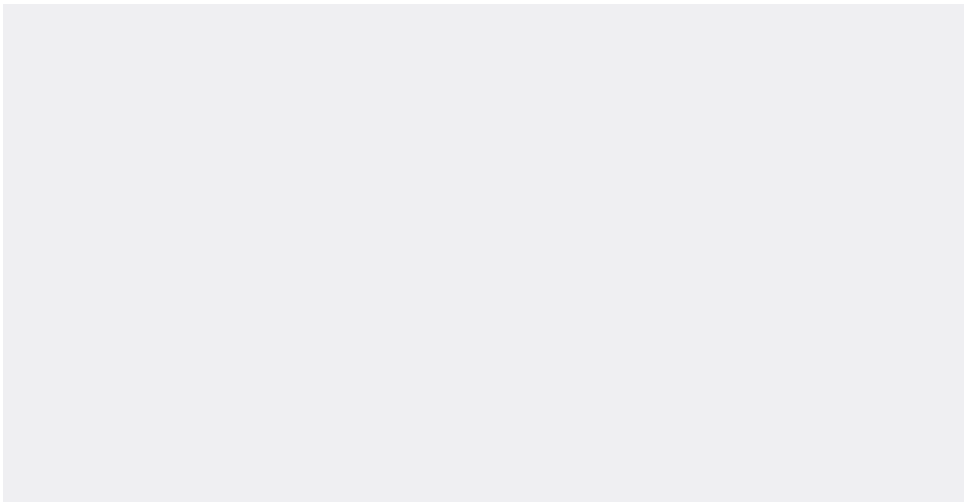


# From 3D Images to Simulation with Simpleware and ANSYS

Simpleware software provides solutions for generating high-quality models from 3D image data (MRI, CT, micro-CT, FIB-SEM...) for direct export to ANSYS software for very realistic simulations. This solution is smooth and robust for workflows using complex image data, and opens up a wide range of applications for ANSYS users needing a straightforward route from scan to CAD, FEA and CFD.

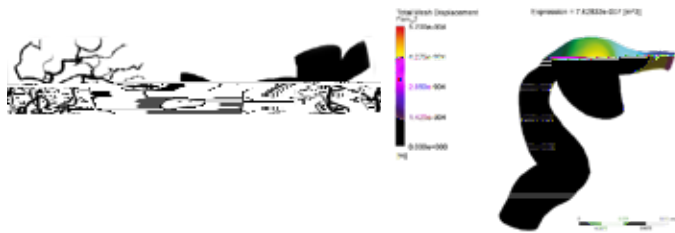
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## Assessment of the Risk of Rupture of Cerebral Aneurysms

M. Sanchez<sup>1,2</sup> • D. Ambard<sup>2</sup> • V. Costalat<sup>2</sup> • S. Mendez<sup>2</sup> • F. Jourdan<sup>2</sup> • F. Nicoud<sup>2</sup>

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Aneurysm model generated in Simpleware and FSI analyses in ANSYS Fluent

CFD models are used for analyzing fluid-structure-interactions (FSI) within an aneurysm, to characterize the risk of rupture for soft (close to the rupture) aneurysms and stiff (healthy) aneurysms. MRI patient data of an aneurysm was imported into Simpleware and segmented and

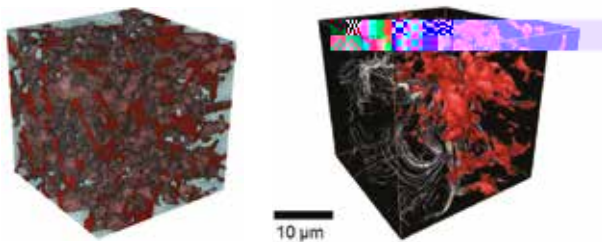
conditions were set before the model was exported as a volume mesh to ANSYS Fluent for FSI analyses, enabling the mechanical properties of aneurysm samples and their risk of rupture to be characterized.

## Effect of Pore Size on Pellet-based Catalyst Flow

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<sup>3</sup>Shell Global Solutions, Amsterdam, Netherlands



FE mesh generated in Simpleware of nano/microstructure and CFD analysis of permeability in ANSYS Fluent

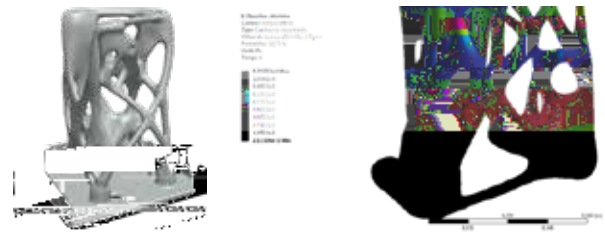
The influence of pore structure on fluid flow across large length scales (ca.  $10^4$  m) in silica-alumina pellet-

performance. Researchers used Simpleware as part of a project that employed multiscale tomography methods to acquire images of catalyst pellets from the nanometer to the millimeter scale. Processed images were meshed in Simpleware and exported to ANSYS Fluent to study the effects of different pore sizes on flow, enabling new insights into the transport properties of catalysts and the design of fuel cells, batteries, flow cells and other energy materials.

## Quality Control of a Metallic Additive Manufactured Part in Space Industry

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3D component models of aluminum part and stress simulation in ANSYS Workbench

Additive Manufacturing (AM) is increasingly being used in the space industry. X-ray CT is used to inspect and analyze defects in AM components, with Finite Element Modeling used to quantify the effect of defects. This case study focuses on a design and validation of an AM process from concept to realization of a single part, made from the aluminum alloy AS7606, that is planned for integration on a TARANIS satellite. The manufactured satellite component was CT scanned to identify the location of porosities within the material. Simpleware was used to generate the model for FEM validation of its structural integration in ANSYS Workbench, using a random vibration model. Comparison of experimental, CAD and FEM results were effective at considering deviations between designed models and scanned geometries.

## Simpleware Software Solutions

The Simpleware product group at Synopsys develops software for the conversion of 3D scan data (MRI, CT, micro-CT...) into high quality design, simulation and 3D printing models. Simpleware software is used in fields such as the Life Sciences, Materials Science, Industrial Reverse Engineering, NDE, and Oil and Gas. Easy-to-learn and use, the software offers a robust bridge between the latest imaging technologies and multiple design and simulation applications.

For more information go to [www.simpleware.com](http://www.simpleware.com)

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