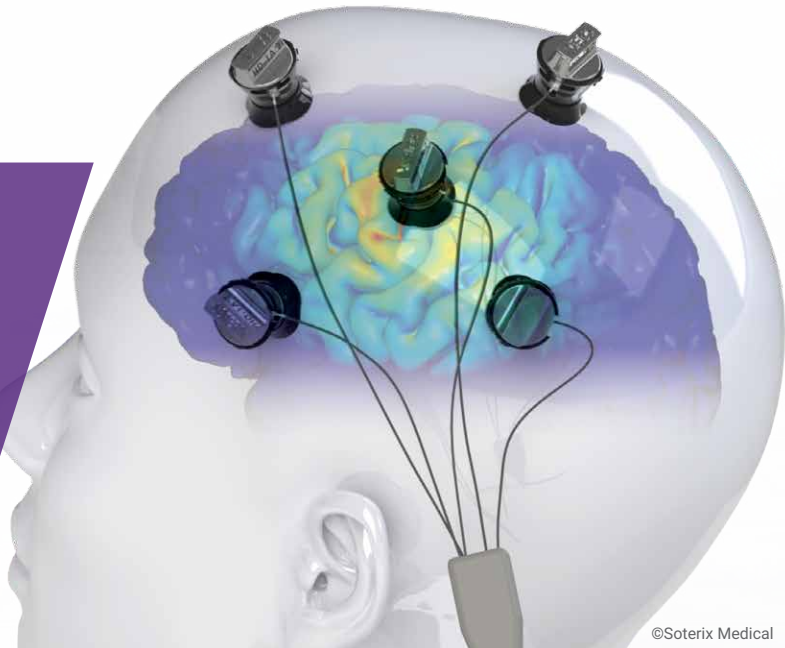# SYNOPSYS®

Simpleware Software for EM Simulation and Neuromodulation

©Soterix Medical

Key Benefits

- FDA 510(k) Cleared
- Intuitive, User-Friendly Interface
- Quick and Accurate Segmentation
- Advanced 3D Image Processing
- Develop Automated Workflows
- Expert Technical Support

Key Features

- Import Clinical Images
- Co-Register Image Data Sets
- Multiplanar Reconstruction (MPR)
- Integrate CAD Implants with Scan Data
- Measurements and Statistics
- Export Simulation-Ready Models

Why Simpleware Software?

Simpleware™ software offers a fast, easy-to-use solution for 3D visualization and inspection of high-value industrial parts from image data. Employ intuitive tools to inspect and measure part defects, reducing the risk of future manufacturing errors. Use the software to generate watertight STLs for direct export to Additive Manufacturing applications, or high-quality volume meshes for FE/CFD simulation of how parts will perform in typical applications.

Intuitive and Customizable

We pride ourselves on the ease-of-use of Simpleware software. Users new to the software can start processing image data within a short time frame, and very quickly visualize and identify regions of interest. Our range of fully automated, semi-automated and interactive segmentation and measurement tools allow even the most challenging image datasets to be processed efficiently. The software also offers scripting tools and plug-ins for users to customize the software and automate repetitive tasks without compromising on accuracy.

Dedicated Support and Training

Our expert technical support team are here to help you get the most out of the software, including step-by-step guidance and personalized support. We also regularly offer classroom training courses at our offices, or you can arrange customized training sessions online or at your site.

Follow us:

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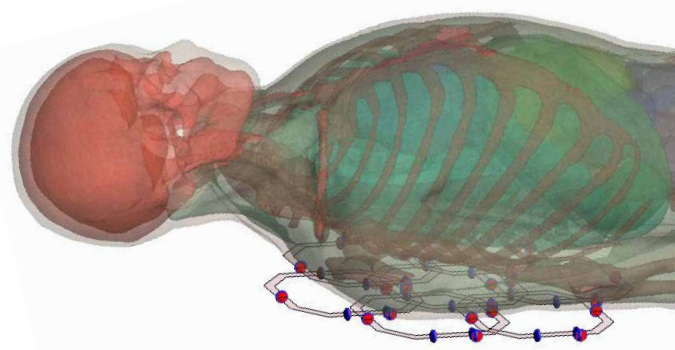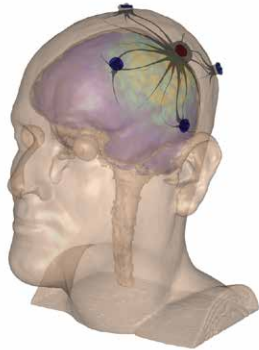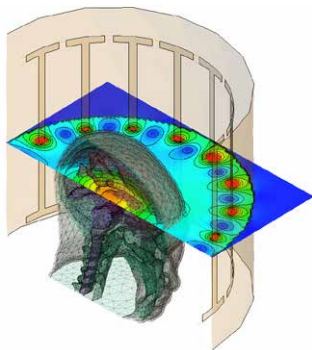
Transcranial Direct Current Stimulation (tDCS)

M. Bikson • A. Datta • F. Fregni • J. Dmochowski • O. Seibt, **Soterix Medical and CCNY, USA**

Transcranial direct current stimulation (tDCS) is a neuromodulation technique that delivers a weak direct electrical current to the brain, and can be used to treat brain injuries, strokes, and other neurological conditions. The team at CCNY and Soterix Medical use Simpleware software to generate accurate patient-specific computational head models that include tissue and electrode montages. These models provide the basis for simulating the effects of tDCS, helping researchers and designers prototype and verify new medical devices prior to manufacturing. By taking advantage of 3D scan, modeling and simulation techniques, researchers can easily create patient-specific therapy protocols for clinical trials.
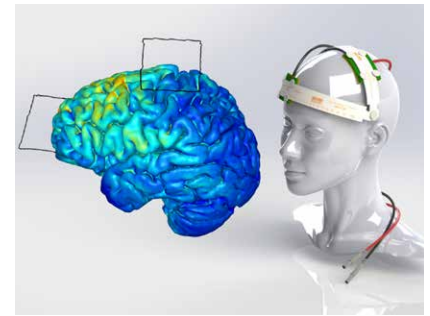

Simulation in COMSOL Multiphysics® of Soterix pad electrodes in an industry-standard head-gear

Electromagnetic Testing of MRI Systems

P. Futter, **Altair FEKO™, South Africa**

Altair FEKO™, a comprehensive computational EM code, was used to help understand magnetic resonance imaging (MRI) systems. Anatomically accurate human body models generated in Simpleware software were imported into FEKO to test design specifications and simulate the effects of high static field strength systems on the human body. The FE models generated in Simpleware software helped optimize 7T head coil and 3T spinal array designs, and to investigate patient absorption of EM and RF energy. The reliability of the Simpleware models demonstrates their significant value for simulation workflows, reducing prototyping costs and improving system efficiencies.
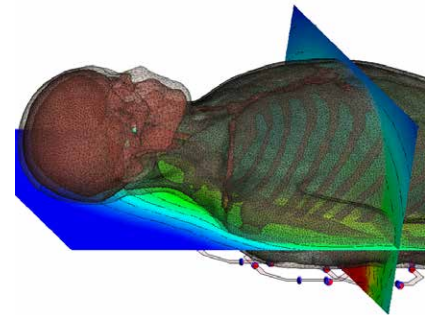

Simulating EM distribution in the human body for 3T spinal array design

Modeling Brain Tumor Treatment

E. Lok • P. San • V. Hua • M. Phung • E. Wong, **Harvard Medical School, USA**

Alternating electric fields, or tumor treating fields (TTFields) therapy, is a type of EM field therapy to treat cancer, particularly recurrent glioblastoma. TTFields therapy delivers low-intensity electric currents through arrays on the scalp and has demonstrated good results compared to traditional methods. However, the precise distribution of TTFields within the brain, and the extent to which they cover the recurrent glioblastoma, remains poorly understood. Computational simulation from medical image data offers a solution for analyzing the effect of TTFields therapy for the treatment of glioblastoma. Simpleware software was used to generate models for this purpose.
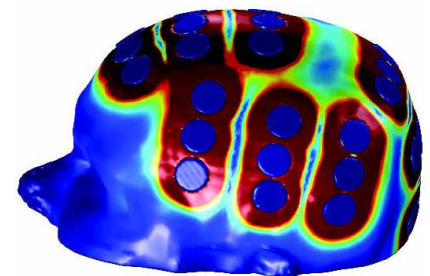

Analysis in COMSOL Multiphysics®: electric field strength highest around the ceramic disks forming each array

Evaluating RF-Induced Heating During MR Imaging

A. Leewood • S. Gopath, **MED Institute, USA**

The MED Institute is using Simpleware software to evaluate radio frequency (RF)-induced heating within the human body during MRI imaging. Human body models generated in Simpleware software from CT data provide a basis for carrying out simulations of heating and specific absorption rate (SAR) in COMSOL Multiphysics®. This approach allows researchers to complement and lower the amount of costly experimental testing by quickly and accurately building models tailored to a range of different simulation requirements. In addition, the method allows for inclusion of passive devices within a high geometric fidelity anatomic model.
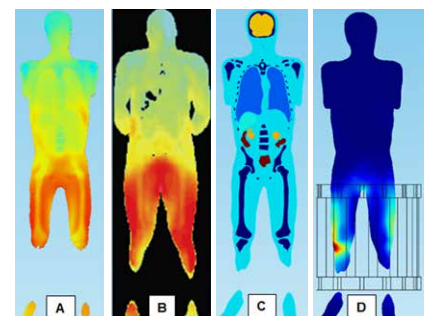
Partial body SAR distributions from 3T birdcage MRI coil at knee location

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