Amira for Life Sciences
Advanced 3D visualization and analysis software

Amira® is a powerful, multifaceted 3D software platform for visualizing, manipulating, and understanding biomedical data from tomography, microscopy, MRI, and more techniques. With incredible speed and flexibility, Amira delivers advanced 3D imaging workflows for specialists in a broad range of research areas, from molecular and cellular biology, to neuroscience and bioengineering.

† Human brain DTI (Diffusion Tensor Imaging) visualization.
Courtesy of Prof. A. Brawanski, University Hospital of Regensburg
Amira
Key Features

Import and export
- Bitmap formats, TIFF, BMP, JPEG, PNG, SGI
- Microscopy-specific formats
- Leica, Zeiss, BioRad, Olympus, MRC
- Medical image formats
- DICOM, Analyze 3D
- Neuroscience formats
- Nifti, HOC, SWC
- Finite element modeling
- FIDAP, I-DEAS, Fluent
- Geometric modeling and CAD
- DXF, STL, VRML, Inventor
- Flexible raw data import
- Very large data support

Process
- 2D and 3D image filtering
- Deconvolution and Z-drop correction
- Interactive / automatic slice alignment
- Image registration and morphing
- Interactive / automatic segmentation
- Skeletonization and tracing of neural and vascular networks
- Dedicated editors for segmentation, tracing and fusion
- Surface generation
- FEM grid generation
- Tensor computation
- DTI tractography
- Powerful scripting interface
- Multicore support for many modules

Visualize
- Interactive high-quality volume visualization
- Orthogonal and oblique slicing
- Volume and surface rendering
- Isolines and isosurfaces
- Multichannel imaging
- Image fusion
- Vector and tensor visualization
- Support of structured and unstructured grids
- Molecular visualization

Mouse thorax. Maximum intensity projection and surface reconstruction. Courtesy of Dr. E. Stepina and Dr. P. Hauff, Bayer Healthcare generation.

Analyze and measure
- Volume, area, and distance measurements
- Densitometry (gray value statistics)
- Filament network statistics
- Co-localization analysis
- Component separation, counting and shape analysis
- Arithmetic operations on images, vector fields, and unstructured grids
- Direct integration of the MATLAB® compute engine

Present
- Video generation
- Advanced key frame and object animation
- Active and passive 3D stereo vision
- Virtual reality navigation tools
- Single and tiled screen display

Volume rendering of cleared spinal cord. Courtesy of A. Ertürk, Max Planck Institute of Neurobiology.
Amira. From 3D-images-to-numbers workflow. From a reconstructed geometry or from any imported 3D data, including time series, Amira basic package delivers a wide range of visualization techniques and interactive manipulation capabilities. Through a comprehensive set of 3D post-processing tools, it offers a highly flexible and powerful 3D visualization and simulation platform.
The Amira software is organized in functional modules consisting of a base package plus optional add-on packages that allow you to optimize to customize the product to fit your exact needs.

The Neuro Option provides tools for Diffusion Tensor Imaging (DTI) experiments, including tensor visualization, directionally encoded color maps (DEC) and fiber tractography. In addition, this option supports brain perfusion analysis on MR or CT time series data.

The Molecular Option adds advanced tools for the visualization of molecule models. Combines hardware-accelerated volume rendering with a powerful molecule editor and specific tools for complex molecular visualization.

The Quantification+ Option delivers high-level tools for obtaining and visualizing advanced quantitative information on 3D images. This option offers the whole range of software tools needed to perform automated segmentation, convolution, object separation, and to extract statistical and geometrical information.

The Skeletonization Option adds tools for reconstruction, analysis, and skeletonized representation of neural and vascular networks and their quantification with regards to parameters such as segment length and diameter. Supports skeletonization of very large image stacks.

The VR Option enables the visualization of your data on large tiled displays or in immersive Virtual Reality (VR) environments. Supports 3D navigation devices as well as fast multithreaded and distributed rendering.

The Mesh Option adds tools for the generation of 3D finite element (FE) meshes from segmented image data. High-quality visualization of simulation results using scalar, vector, and tensor field display modules.

The Very Large Data Option adds support for the visualization of image data that exceeds the available main memory of your computer using efficient out-of-core data management. Extends the use of many standard modules such as orthogonal and oblique slicing, volume rendering, and isosurfacing.

The Developer Option allows you to create new custom components for visualizing or processing data, file readers or writers, using the C++ programming language. Includes a development wizard for getting started quickly.

The Multi-Component Analysis Option: whenever there is the need to analyze image stacks with numerous similar components this option provides you with the necessary tools. The modules of this option enable a complete workflow, from generating the binary image by using local thresholds, separating clustered items, up to the extraction of shape parameters from them.

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Amira is available for Windows®, Mac OS®, and Linux.