ThermoFisher SCIENTIFIC

Amira Software for life and biomedical sciences

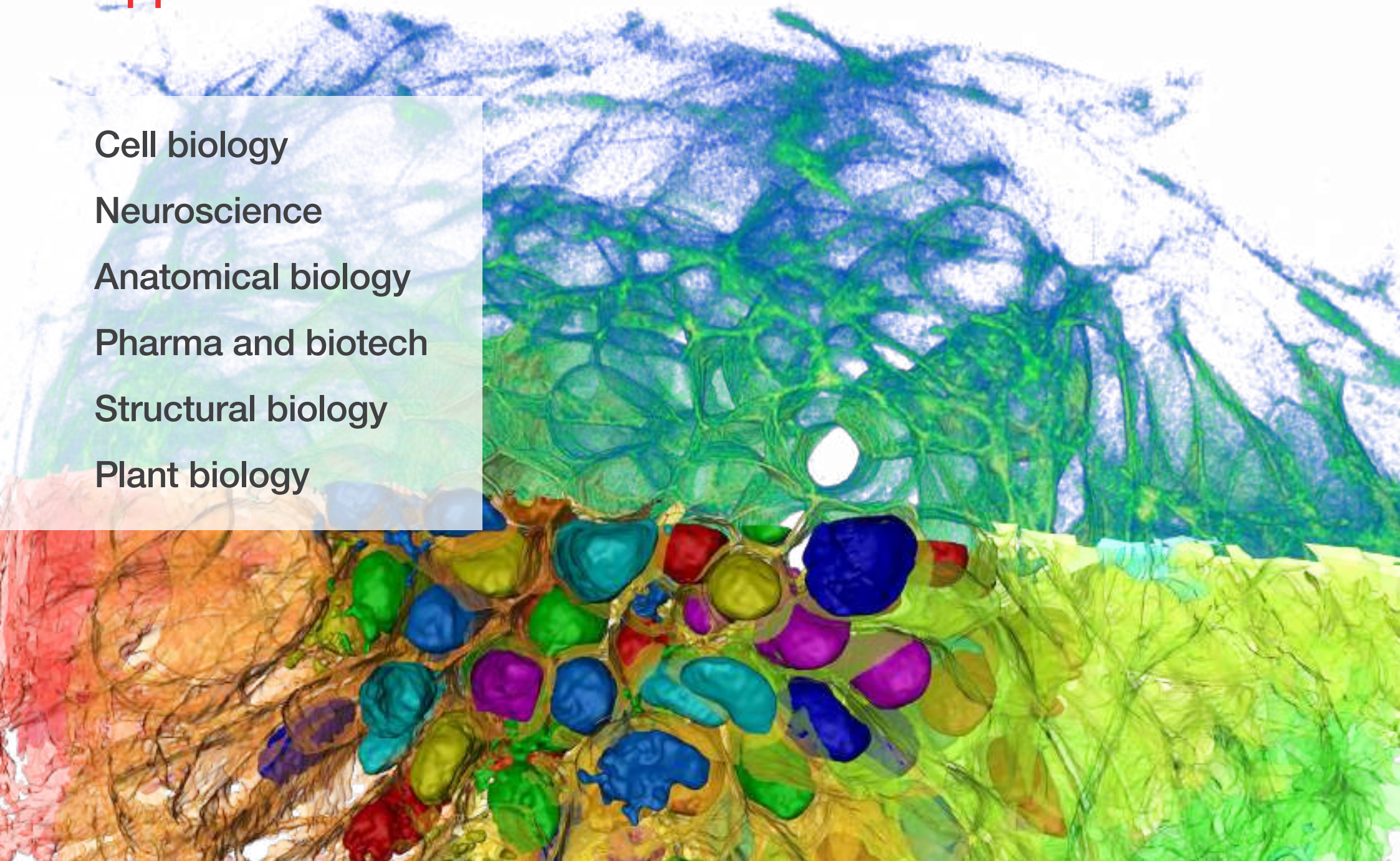
Transform your images into understanding

thermo scientific

Discover Thermo Scientific™ Amira™ Software, the ultimate tool for visualizing and analyzing 2D to 5D research data. Compatible with light and electron microscopy, CT, and MRI, it supports cellular biology, tissue imaging, neuroscience, and bioengineering.

With high-resolution visualization, powerful AI-based analysis tools, and a user-friendly interface, Amira Software drives groundbreaking discoveries.

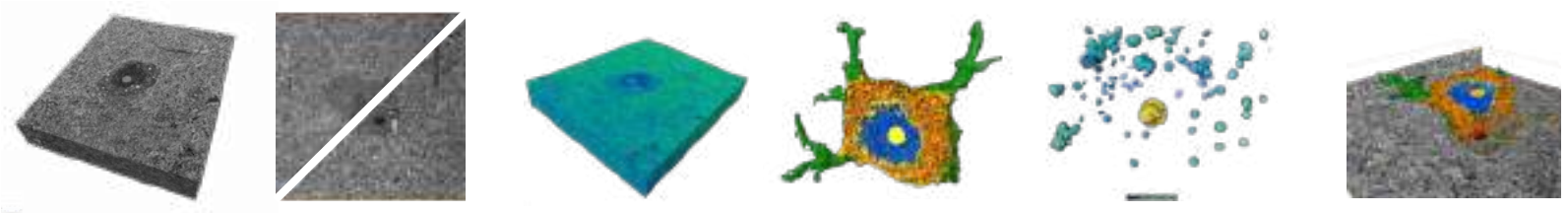
Applications



- Cell biology
- Neuroscience
- Anatomical biology
- Pharma and biotech
- Structural biology
- Plant biology

Amira Software: from data to discovery

Amira Software provides a comprehensive toolbox for advanced 2D–5D biological characterization. It enhances time-efficiency, reliability, and reproducibility with automated tools for image data analysis in life science research.



Data acquisition*

- Computed tomography (CT)
- Confocal microscopy
- Cryo-tomography
- Focused ion beam-scanning electron microscopy (FIB-SEM)
- High content screening
- Magnetic resonance imaging (MRI)
- Light microscopy
- Serial block face-scanning electron microscopy (SBF-SEM)

Imports

- Raw imaging data
- Imports from multiple imaging modalities
- Very large data
- BioFormats

Filtering and pre-processing

- Noise reduction of sample images
- Image artifact reduction
- Background correction

Visualization

- Interactive, high-quality 2D-5D visualization
- Direct manipulating of objects

Segmentation

- Thresholding and auto-segmentation
- Automatic labeling of objects

Measurement/Analysis

- Built-in measurements such as counts, volumes, areas, perimeters, aspect ratios and orientations
- Custom, user-defined measurements

Animation/Presentation

- Advanced video animations
- Charts, spreadsheets, and reports

> "Amira [Software] includes virtually any function one could imagine when it comes to high-end image processing, segmentation, and visualization analysis. This immensely broad functionality makes it quite unique."
>
> Stephan Handschuh, VetCore, Facility for Research Imaging Unit, University of Veterinary Medicine, Vienna

** Amira Software is not an acquisition software*

Amira Software for image analysis and visualization

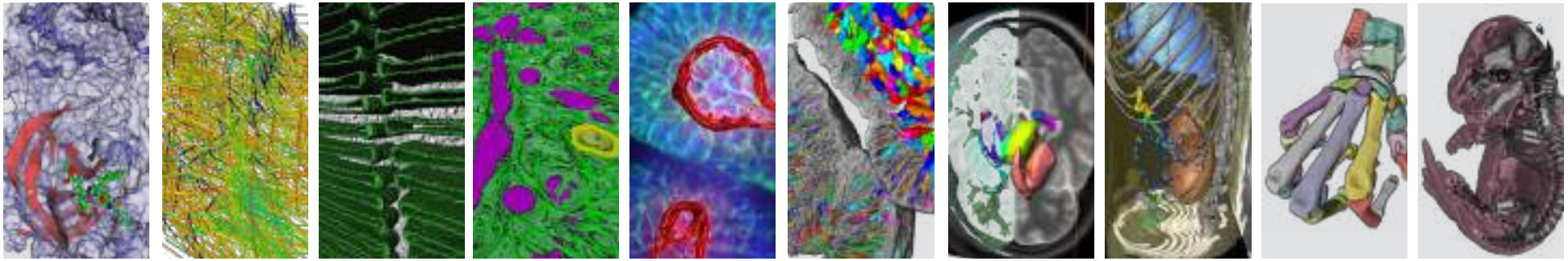
along different scales and modalities

Amira Software offers advanced AI tools for comprehensive data analysis across various scales and imaging modalities. It supports seamless integration of data from different techniques, enabling detailed multi-scale investigations. This versatility allows you to analyze complex structures and relationships with precision, enhancing the depth and accuracy of scientific insights.

Molecular Å 10^{-10}			Cellular µ 10^{-6}m		Anatomical cm 10^{-3}m				
Small molecule	Protein	Organelle	Cell	Organoid	Tissue	Organ/tumor	Vascular system	Skeleton	Whole body

Electron icroscopy, confocal, fluorescence, bright field, high-content screening…

…microCT, micro MRI, micro PET



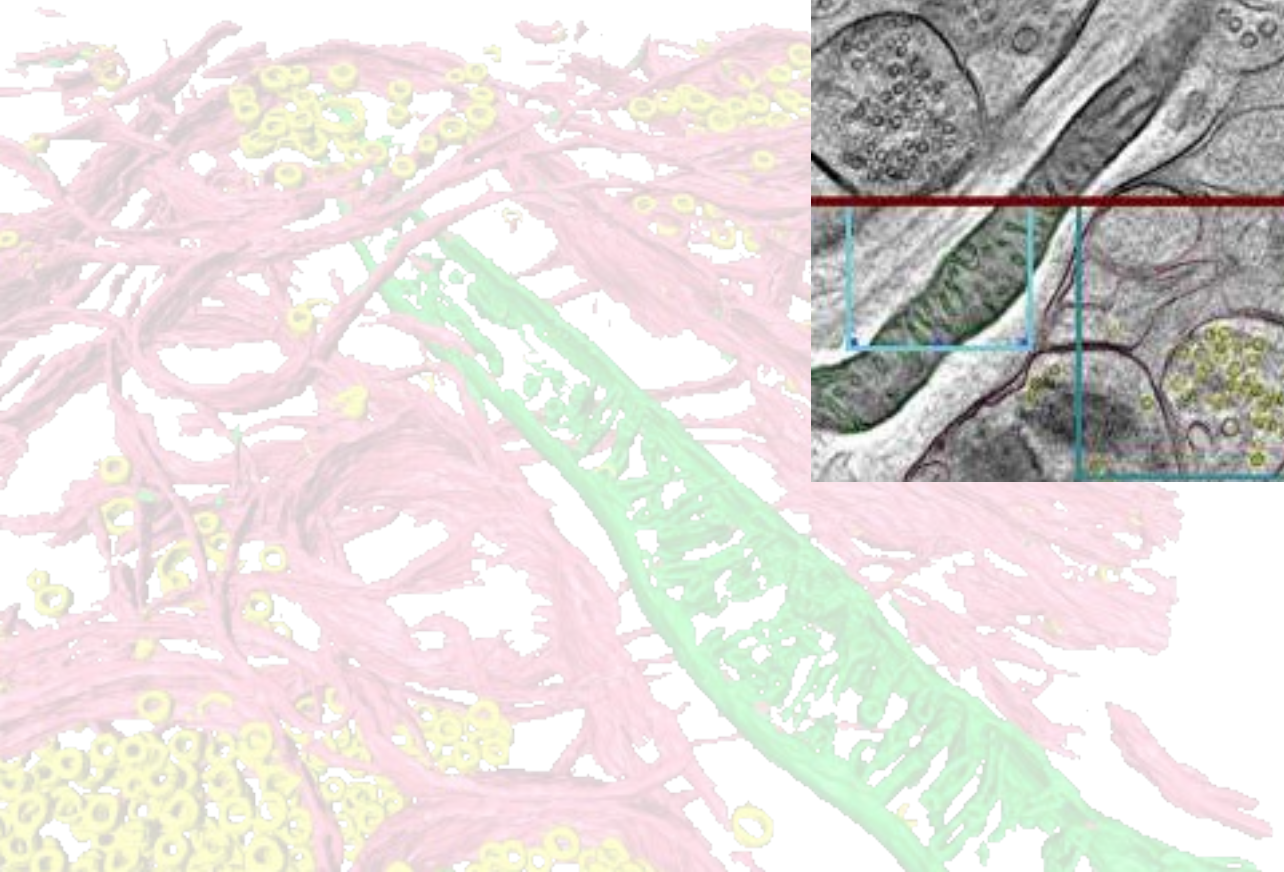
> “It’s very powerful software [that’s] good for both electron microscopy and fluorescence microscopy, which is quite extraordinary, because typically software is focusing on either one of those. You can do so much with the software–I would really recommend Amira [Software].”
>
> Matthia A. Karreman MSc, PhD, EMBL, Heidelberg, Germany

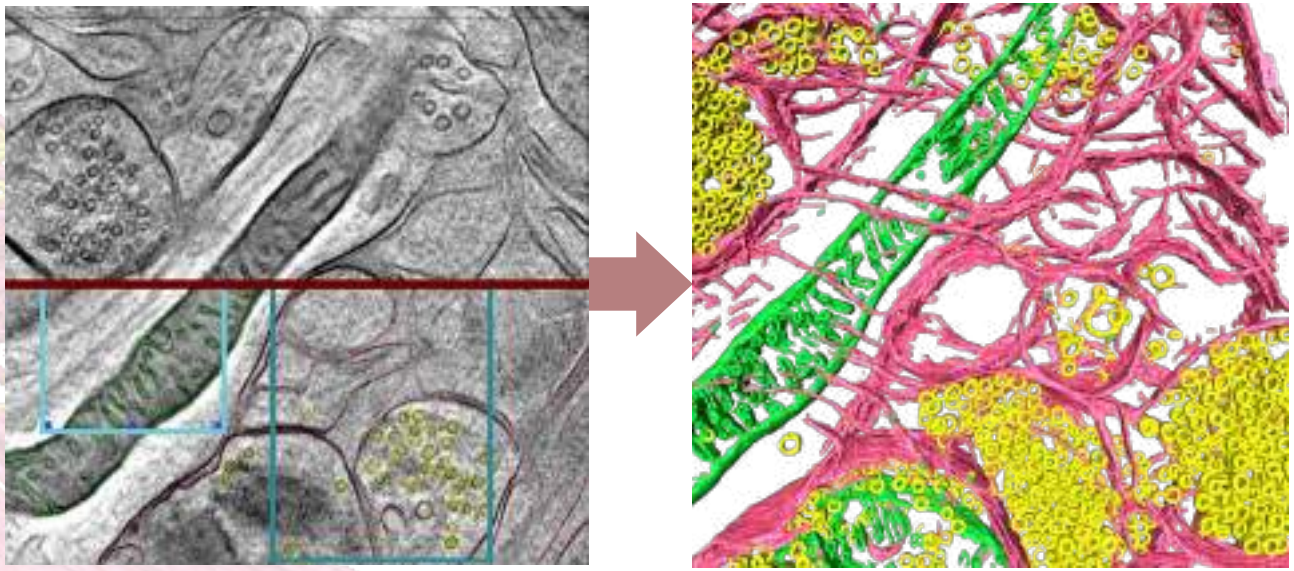
Precision with AI-driven segmentation

Amira Software comes with advanced AI-driven segmentation tools, designed to deliver exceptional accuracy and efficiency for data analysis. Our dedicated segmentation workroom integrates innovative artificial intelligence and intuitive annotation tools that simplify the creation of ground truth data.

Amira Software offers versatile AI segmentation models, providing both shallow models for speed in less complex tasks and deep models for high precision in intricate image analysis. You can perform training in 2D or 3D, depending on your data's requirements.

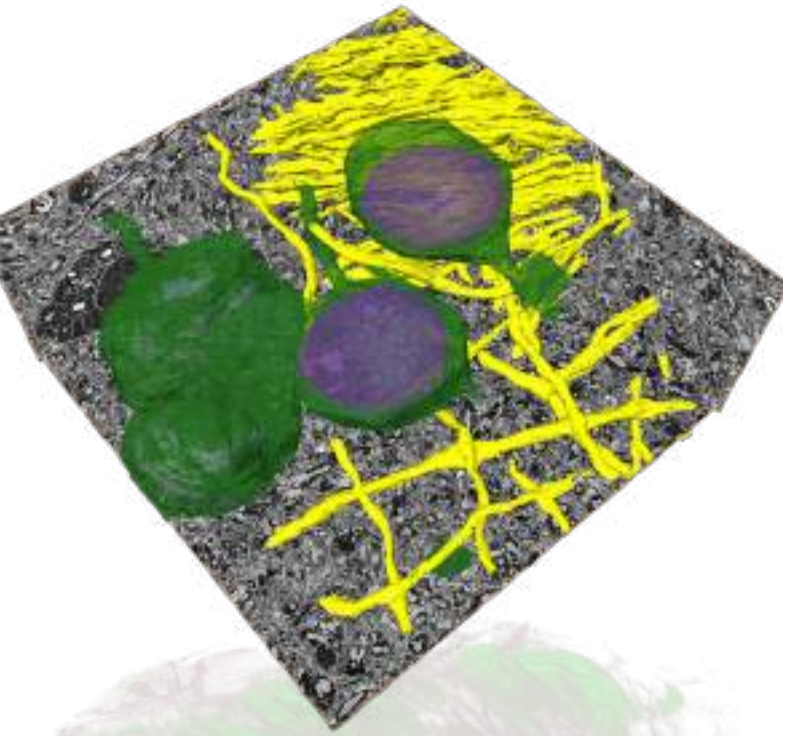
With a user-friendly interface, high accuracy, and efficient processing, Amira Software is an ideal choice for professionals in research and industry.





Benjamin Cooper, Max Planck Institute for Experimental Medicine, Göttingen Germany

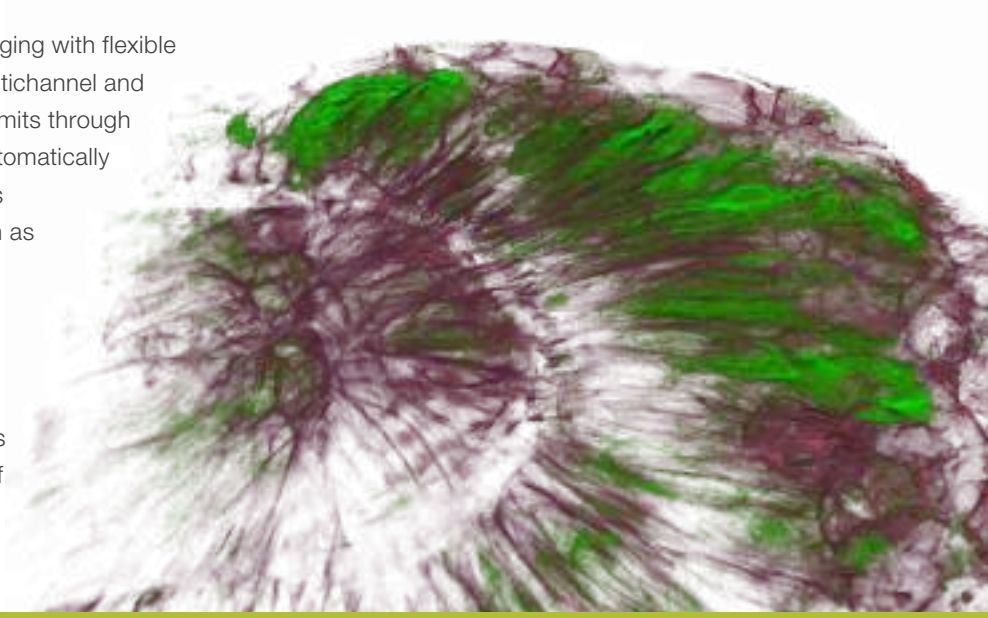
Enhance your cell biology research



Amira Software simplifies the analysis of complex imaging data, offering insights beyond 2D images. This includes the ability to automatically separate and measure cells and nuclei in 3D image data, making it an ideal choice for 3D cell cultures like spheroids. It also detects cellular features, reduces noise, and increases contrast for high-resolution models.

Amira Software supports multi-modal imaging with flexible registration tools and processes large multichannel and time series data without size or memory limits through the Xplore5D extension. Additionally, it automatically detects and traces filaments, reconstructs networks, and quantifies parameters such as length and thickness.

Furthermore, correlative studies can be conducted using intermodal registration methods that allow freedom in workflow design. The efficacy of these methods has been proven through an extensive array of applications spanning numerous fields in the life sciences.



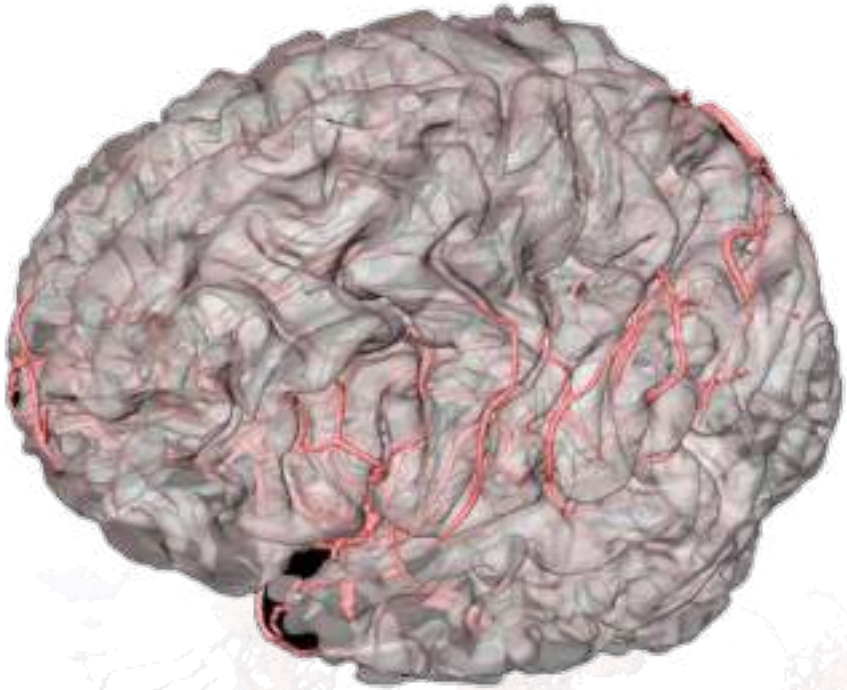
“Amira Software helps to set up complex data processing workflows. [...] We particularly like the general idea of how Amira Software is organized in the project view. This helps to set up complex data processing workflows. The great variety of specialized image processing modules makes Amira Software particularly useful for EM data. The segmentation modules are very flexible, and it is easy to combine different tools enabling the segmentation of complex structures.”

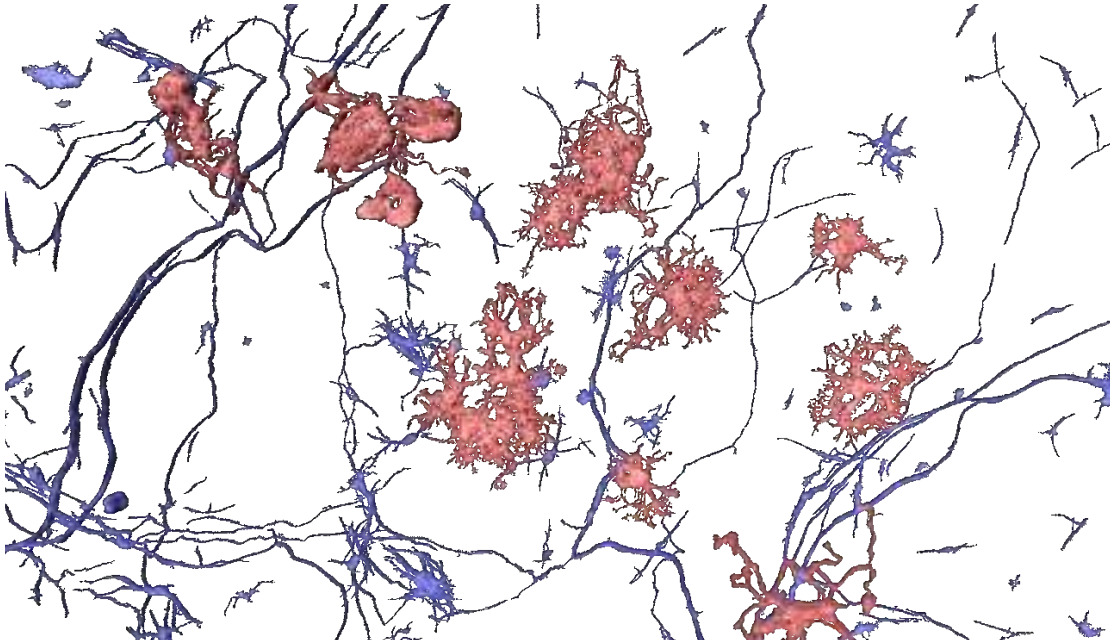
Steffen Klein, Chlanda lab, Department of Infectious Diseases, Virology, Heidelberg University, Heidelberg, Germany

Advancing neuroscience and brain research

Neuroscientists use various techniques, from structural biology to whole brain imaging, to study the brain's complexities. Amira Software is a key tool in this research, offering comprehensive solutions for analyzing intricate neural data across different scales and modalities, providing deeper insights into neural structures and functions.

Amira Software processes large multichannel datasets acquired by light sheet or confocal microscopy without size or memory limitations. Automated features like AI segmentation, filament detection, and network reconstruction reduce manual effort and boost productivity.

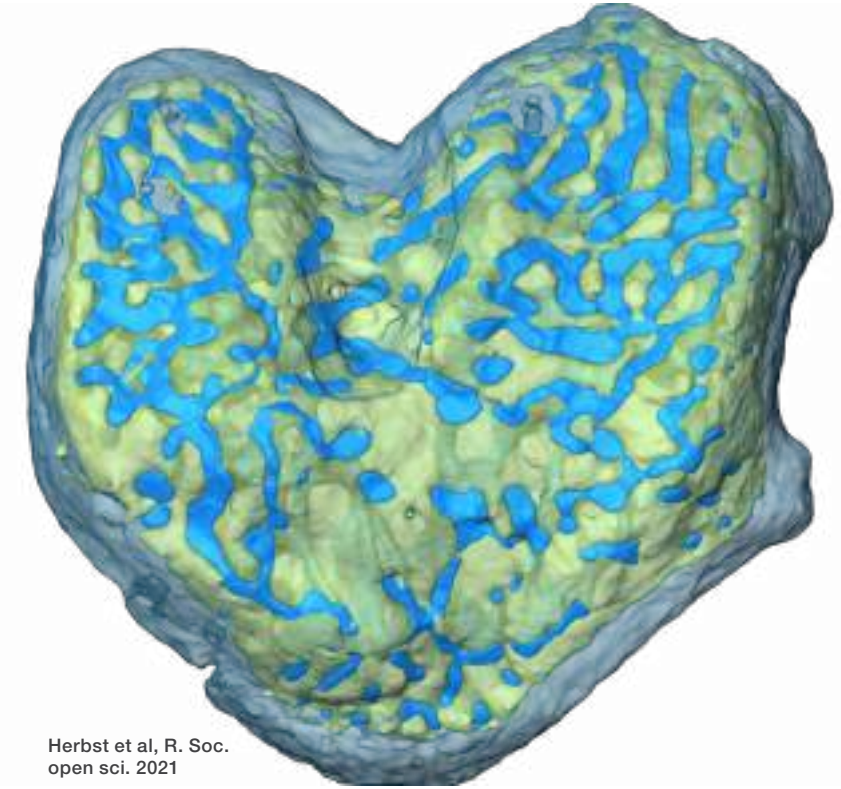




Additionally, it provides advanced and affordable tools for CT and MRI/DTI data including creation and utilization of brain atlases, tracing neuronal connectivity and robust image registration tools. The enhanced visualization options support grayscale images and tensor fields. By implementing well-established algorithms, Amira Software reliably advances our understanding of brain connectivity.

For nearly two decades, Amira Software has been a cornerstone in neuroscience research, widely cited in academic publications. It empowers neuroscientists to push research boundaries, from molecular structures to whole brain imaging, driving innovation and advancing our understanding of the brain.

Studying anatomical biology: Bone research



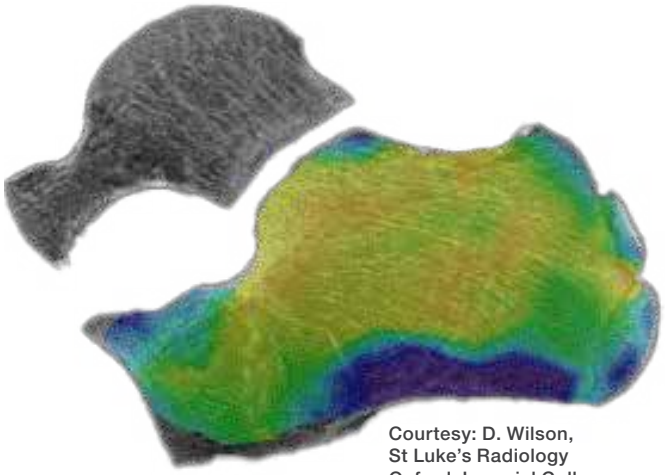
Herbst et al, R. Soc. open sci. 2021

Investigating bones with microscopy and CT is crucial for advancing our understanding of bone structure, pathology, and regeneration, which can lead to improved diagnostics, treatment strategies, and outcomes in orthopedic and medical research. However, the segmentation process, especially separating bones into individual types, can be extremely time-consuming due to the many bones in vertebrate bodies.

Amira Software offers a solution to this labor-intensive task with semi-automated and, in some cases, fully automated workflows. It includes specialized workflows for automated segmentation of cortical versus trabecular bone. This robust segmentation framework, developed and refined over nearly two decades, is continuously improved to meet researchers' needs.

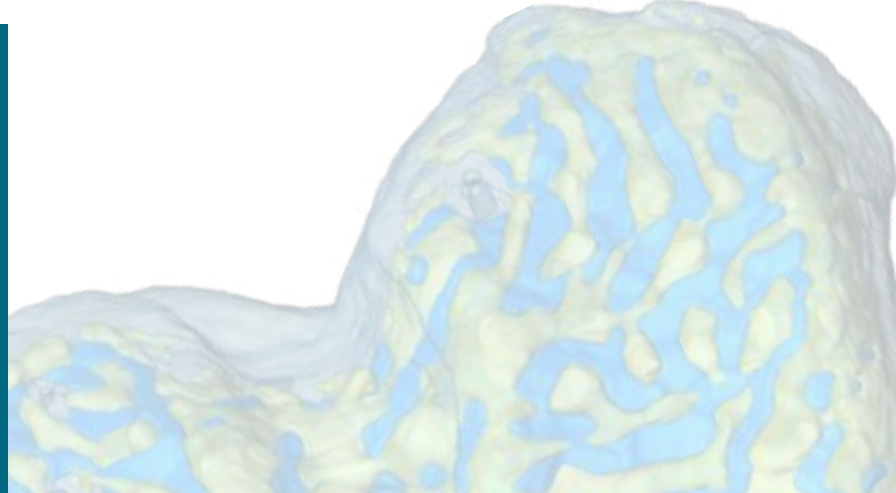
Additionally, Amira Software supports digital volume correlation (DVC), enabling researchers to measure non-contact, 3D volumetric displacement and strain data within biological tissues and implants under various conditions. This capability is crucial for studying the mechanical properties of bones and other structures, allowing for better understanding of strain transfer and failure mechanisms.

Amira Software has proven its effectiveness in numerous studies, including the life-size 3D printing of physical models, making it an invaluable tool for bioengineers.



Courtesy: D. Wilson, St Luke's Radiology Oxford, Imperial College

> "Amira XDigtalVolumeCorrelation is a powerful software for scientists willing to measure the mechanical behaviour of advanced biomaterials and their complex interaction with the hierarchical structure of hard/soft tissues. The use of conformed meshes combined with the robust FE-based DVC approach simplifies the dialog with FE models, opening the door to the design of new medical devices."
>
> Dr. Kamel Madi, Co-founder/CEO, 3Dmagination Ltd

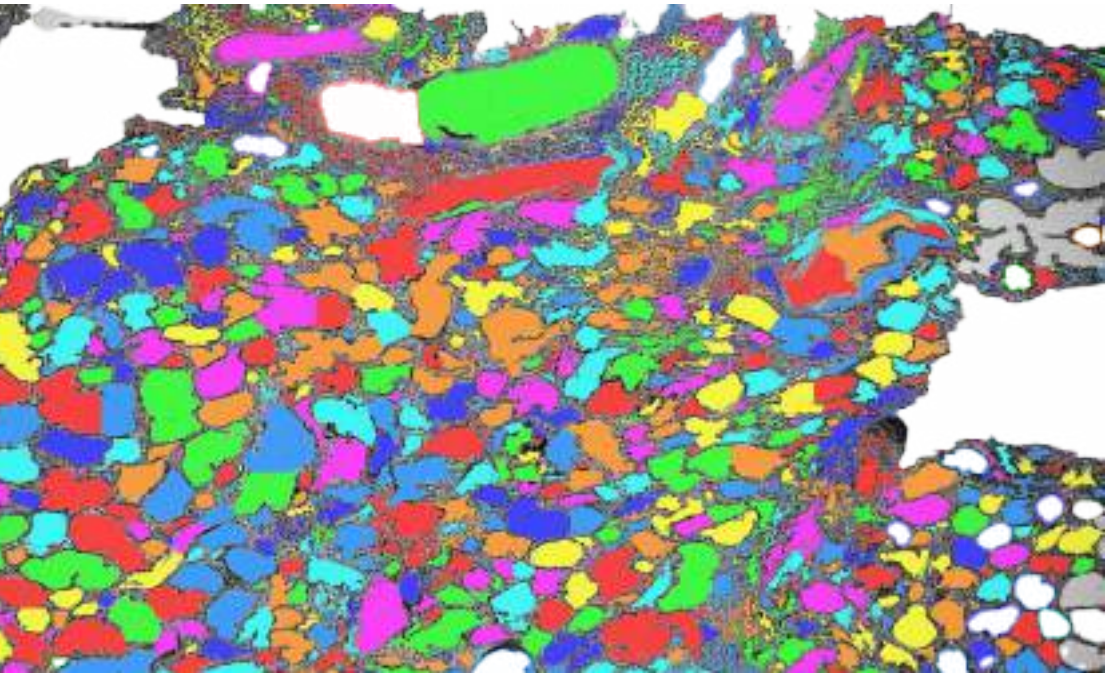


Studying anatomical biology: Soft tissue

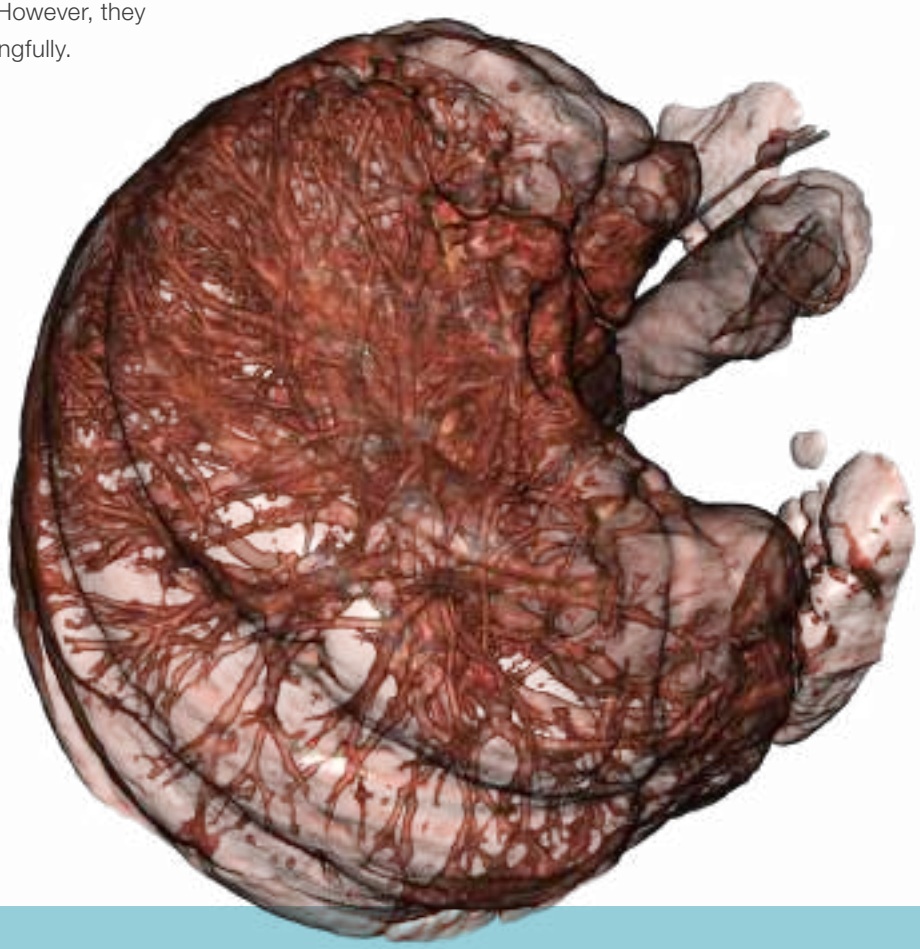
Scientists in biomedical and pharmaceutical research who perform in vivo drug testing and study animal models of human diseases can choose from numerous imaging modalities to augment their data collection. However, they often struggle with using various vendor-specific image analysis tools to combine their data meaningfully.

Amira Software offers a flexible solution within a unified framework, enabling seamless registration of multiple imaging modalities and correlative analysis at single time points or across longitudinal studies. Widely used in publications and routine high-throughput analysis, it provides a mature and efficient solution for tissue investigation, brain research, dental research, and many other applications.

Amira Software is highly effective for the visualization, segmentation, and analysis of large datasets, utilizing both conventional and fully integrated AI solutions. These capabilities make Amira Software an invaluable tool for preclinical and clinical research imaging.

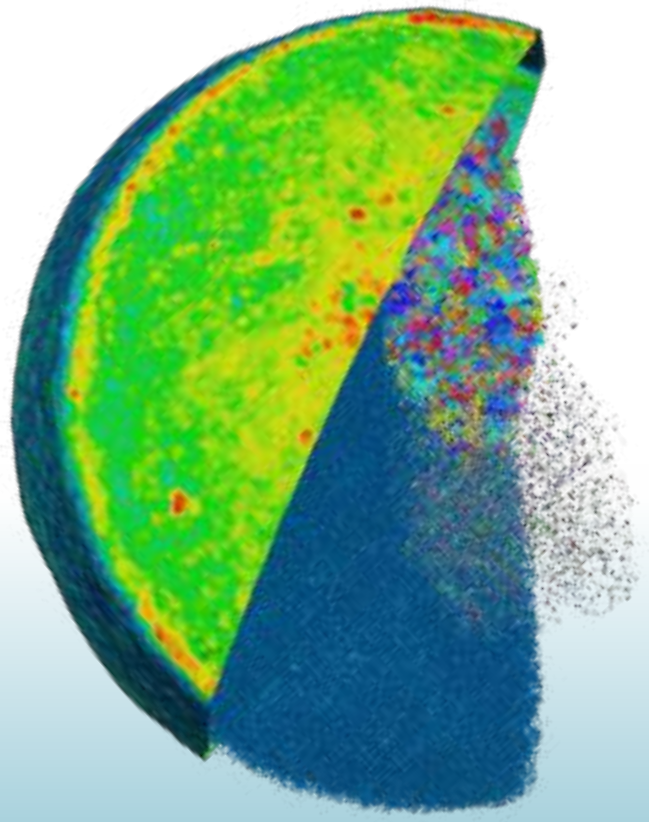


Data courtesy of Stephanie Sarrazy Garcia, PhD from Innoskel



> “Amira Software permits our original optical dataset to be completely loaded into its software package at full resolution, where object manipulation is easy and rapid for initial tissue interrogation studies.”
>
> Human Photonics Laboratory (HPL), University of Washington

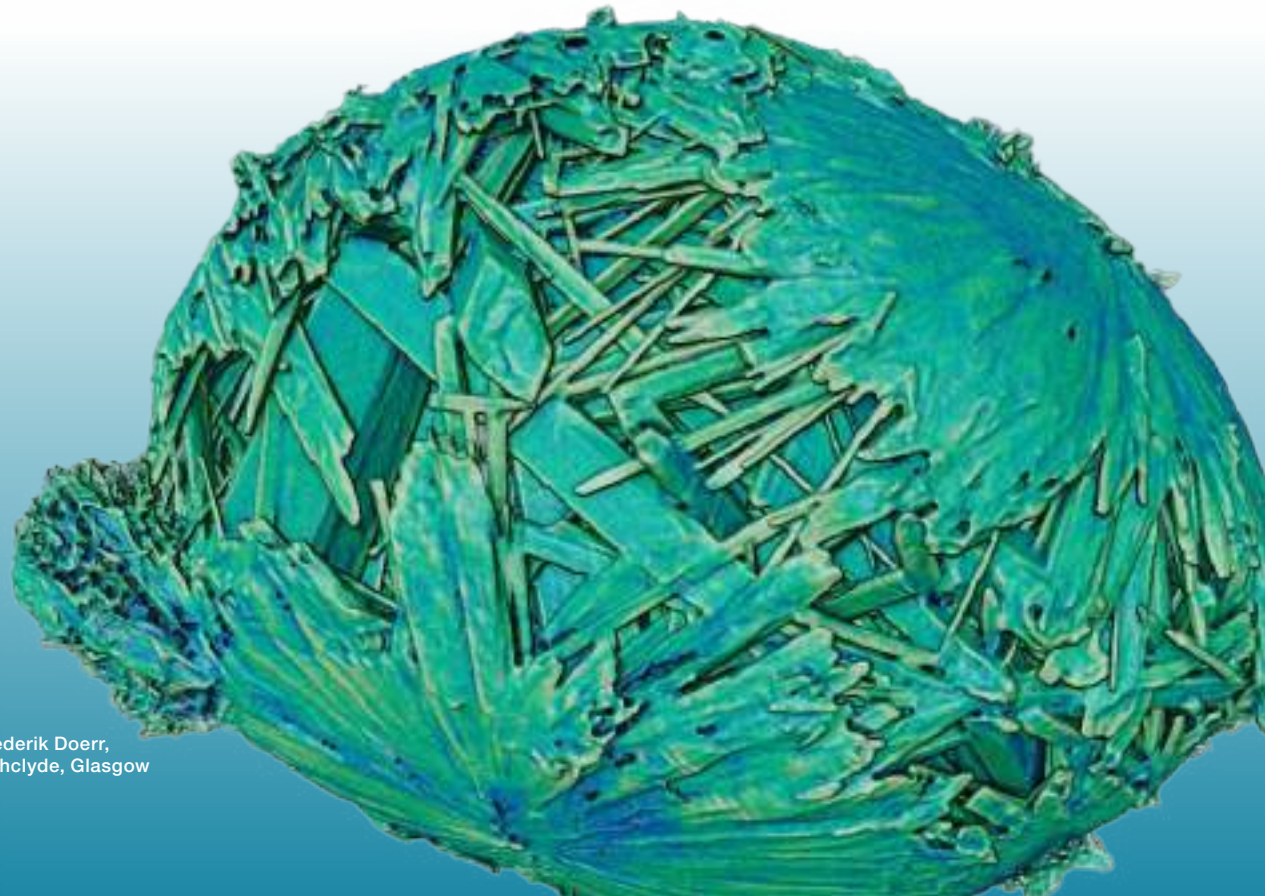
Accelerate drug discovery



The pharmaceutical and biotechnology industries face significant challenges, including condensed R&D timelines, increasingly complex datasets, and the need to reduce manual steps and automate processes to enhance accuracy and efficiency. Researchers are under immense pressure to deliver safe and effective drugs quickly.

Amira Software addresses these challenges by providing a comprehensive imaging analysis toolbox designed to support the visualization, segmentation, and understanding of complex life science data from various imaging modalities. It features advanced imaging analysis, AI-based deep learning models for segmentation, and automated workflows, aiding in drug discovery, target identification, and preclinical research.

Thermo Fisher Scientific offers professional support and customization services to enhance the software's utility, accelerating drug discovery and improving the understanding of biological systems.

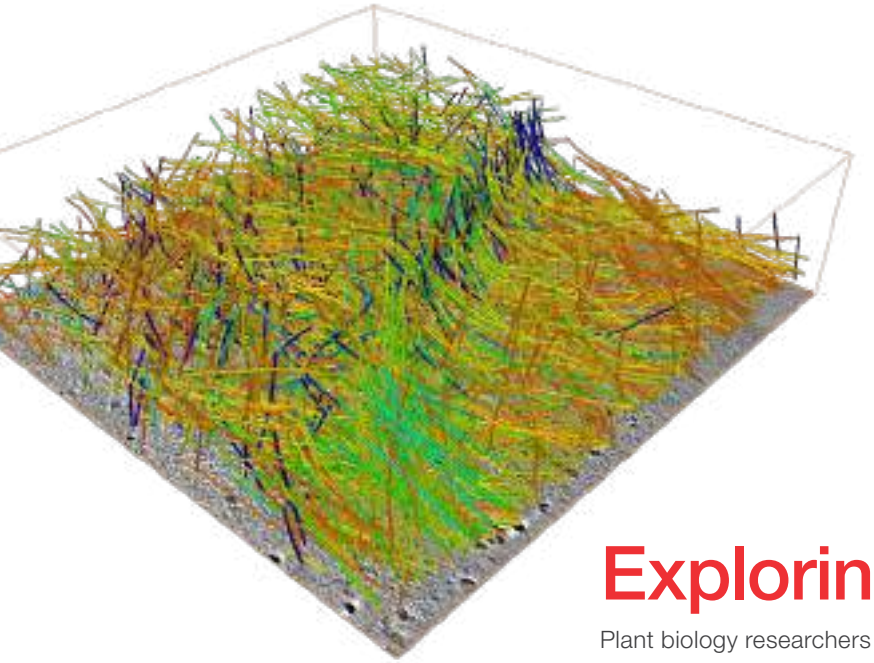


Data courtesy: Frederik Doerr, University of Strathclyde, Glasgow

Empower your lab with an innovative, comprehensive imaging analysis toolbox.

Read the eBook

Unveiling structural biology



Structural biology researchers can obtain cellular structure insights with textbook quality, but they face challenges with the high-precision segmentation of vast numbers of particles and filaments. Additionally, visualization results can sometimes appear fuzzy.

Amira Software minimizes labor effort while enhancing visualization quality. It employs a fully automated and highly precise workflow based on template-matching, requiring only a few parameters for filament tracing. This approach improves both the quality and speed of filament detection, outperforming manual segmentation and even AI deep learning segmentation tools.

Moreover, Amira Software allows users to replace detected molecules in image data with models from databases, enhancing visualization. The efficacy of Amira Software's structural biology workflow is well-documented, with its components successfully applied in numerous research studies and results published in multiple scientific journals.

Exploring plant biology

Plant biology researchers utilize 3D image analysis, correlative microscopy approaches, and quantitative data extraction to analyze complex plant morphology and understand physiological mechanisms.

Amira Software provides an easily accessible, user-friendly platform for plant biology researchers, enabling them to perform various types of analyses with one solution. It offers automated workflows for plant tissue analysis, including roots, stems, leaves, and cellular structures. With powerful segmentation tools and integrated AI solutions, Amira Software enhances data processing accuracy and speed, surpassing traditional methods.

Additionally, Amira Software integrates multimodal imaging data, enabling seamless correlation of different data types. This is crucial for tracking growth patterns, studying cellular responses to environmental stimuli, and understanding plant-microbe interactions.

Amira Software's robust visualization and analysis capabilities make it an invaluable tool for advancing plant biology research.

Professional services

Thermo Fisher Scientific offer a comprehensive set of professional services. From training to consulting or custom development, our professional services experts are dedicated to helping you maximize your productivity with Amira Software.

User training

Custom training is tailored to equip you with practical skills that align with your specific goals. It can be conducted on-site at your location or at one of our facilities.

- Introductory
- Advanced
- Custom

Consulting solutions

Our experts help you maximize Amira Software's innovations for your daily work. We partner with you to create solutions tailored to your tasks and expertise.

- Workflows
- Optimization
- Image processing as a service

Application development

With 30 years of 3D and image processing experience and hundreds of completed projects, we deliver solutions tailored to your specific needs.

- Tailored solutions
- Workroom development
- Standalone applications
- Deep learning model training and deployment

Key advantages of using Amira Software in life sciences and biomedical research

Amira Software is a powerful tool for visualizing and analyzing complex biological and biomedical data. It supports various imaging modalities and research fields, offering high-resolution visualization, advanced AI tools, and an intuitive interface. Below are the key benefits that make Amira Software essential for life sciences and biomedical research.

Comprehensive data analysis

Supports visualization and analysis of 2D to 5D research data from various imaging modalities like light and electron microscopy, CT, and MRI.

High-resolution visualization

Offers detailed and high-quality visualizations to drive groundbreaking discoveries.

User-friendly interface

Designed with an intuitive interface, making it accessible for both novice and experienced users.

Advanced AI tools

Includes sophisticated AI-driven segmentation models for precise and efficient image analysis.

Versatile applications

Suits a wide range of applications including cell biology, neuroscience, anatomical biology, pharma and biotech, structural biology, and plant biology.

Automated workflows

Enhances time-efficiency, reliability, and reproducibility with automated tools for image data analysis.

Robust data handling

Manages large datasets efficiently and supports almost all established file types.

Multi-scale analysis

Supports detailed investigations from molecular structures to whole-body imaging.

Comprehensive measurement tools

Provides over 200 built-in measurements and allows custom, user-defined measurements for detailed quantitative analysis.

Professional support

Offers extensive training, consulting, and custom development services to help users maximize the software's potential.

Proven efficacy

Is widely cited in academic publications, making it a cornerstone in life sciences research for nearly two decades.

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Unleash the full potential of your Amira Software

Amira Software is a versatile digital analytical lab for visualizing, manipulating, and understanding scientific and industrial imaging data from computed tomography, microscopy, and other imaging modalities. Amira Software, empowered by extensions, offers unique advanced capabilities tailored to specific use cases. To dramatically boost your productivity and push the boundaries of your image analysis projects, explore the optional packages available below.

● Standard ○ Optional

Packages / Extensions	3D	3D pro	3D cell biology	3D EM systems	Subscription program
Data import, visualization, segmentation, analysis, animation (basic feature set)	●	●	●	●	●
Advanced segmentation, quantification, EM Toolbox, ToGo Publisher (extended feature set)	○	●	●	●	●
Extended image file format support (XBioFormats extension)	○	○	●	●	●
FIBStack Wizard, EMWorkflows, Thermo Scientific EM Readers, EM Toolbox, Cylinder and Trace Correlation Lines (EM-specific feature set)				●	
Visualization, processing, and animation of large multi-channel and time-series data (Xplore5D extension)	○	○	●	○	●
Fibers, filament, and tubule segmentation and analysis (XFiber extension)	○	○	●	○	●
Advanced meshing and export to solvers (XWind extension)	○	○	○	○	●
Pore network characterization and modeling (XPNM extension)		○	○	○	●
Digital volume correlation for material deformation measurements (XDVC extension)	○	○	○	○	●
Localization and visualization of fiber tracts using diffusion tensor imaging (XNeuro extension)	○	○	○	○	●

Learn more at **thermofisher.com/amira**

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