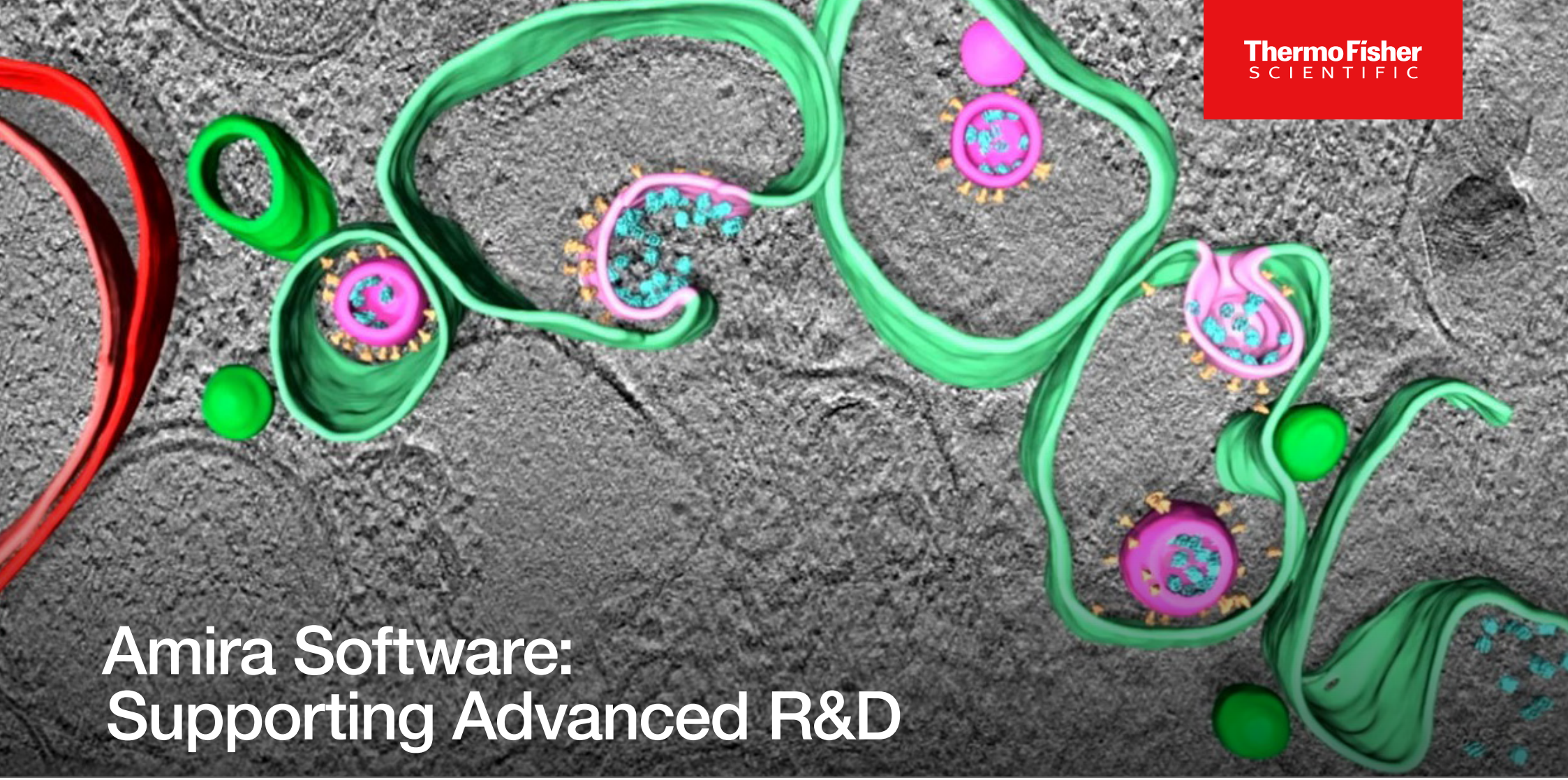


Amira Software: Supporting Advanced R&D

For breakthrough drug discoveries

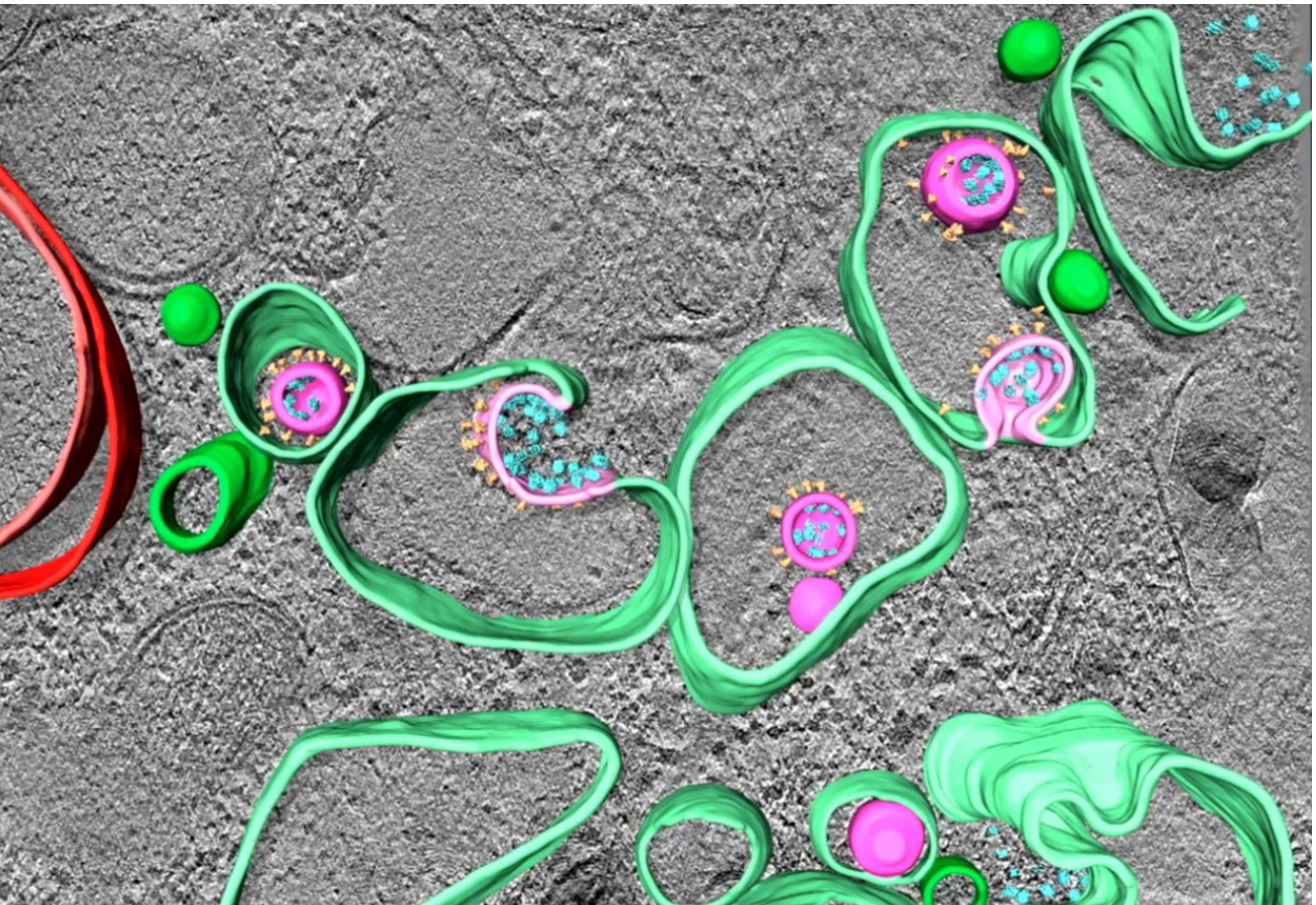
thermo scientific

Pharmaceutical research and development firms face immense competition to be the first to release a drug to the market. Thermo Scientific™ Amira™ Software provides these R&D teams with a powerful, multifaceted software toolbox that can helps to alleviate some of this immense pressure by accelerating the discovery and identification process. Amira Software is a highly dependable, state-of-the-art, reliable, and automated 2D to 5D platform for visualizing, manipulating, and understanding life science research data. This powerful, automated software for biological imaging reduces the number of manual steps in the drug discovery process, which in turn decreases analysis time while increasing accuracy and improving cost-efficiency. Amira Software works with multiple image modalities, including microscopy, high-content screening, X-ray and MRI techniques, and more, making it the ideal software for everything from target discovery and compound identification to preclinical research.

Advanced research and development for breakthrough drug discoveries

Amira Software can manage images at any scale or from multiple imaging modalities, supporting drug discovery screening and pharmaceutical research from a structural, sub-cellular level up to organ and anatomical biology. By pushing these limits of analysis, life science researchers can better understand how cells function or respond to disease or genetic variations, and then use these findings to advance research and development for breakthrough drug discoveries.

The applications that Amira Software offers are numerous. It has the computing power to accurately observe neuronal networks within a fully functioning brain, while its advanced imaging segmentation can sort and identify metastatic protein and cellular behaviors.

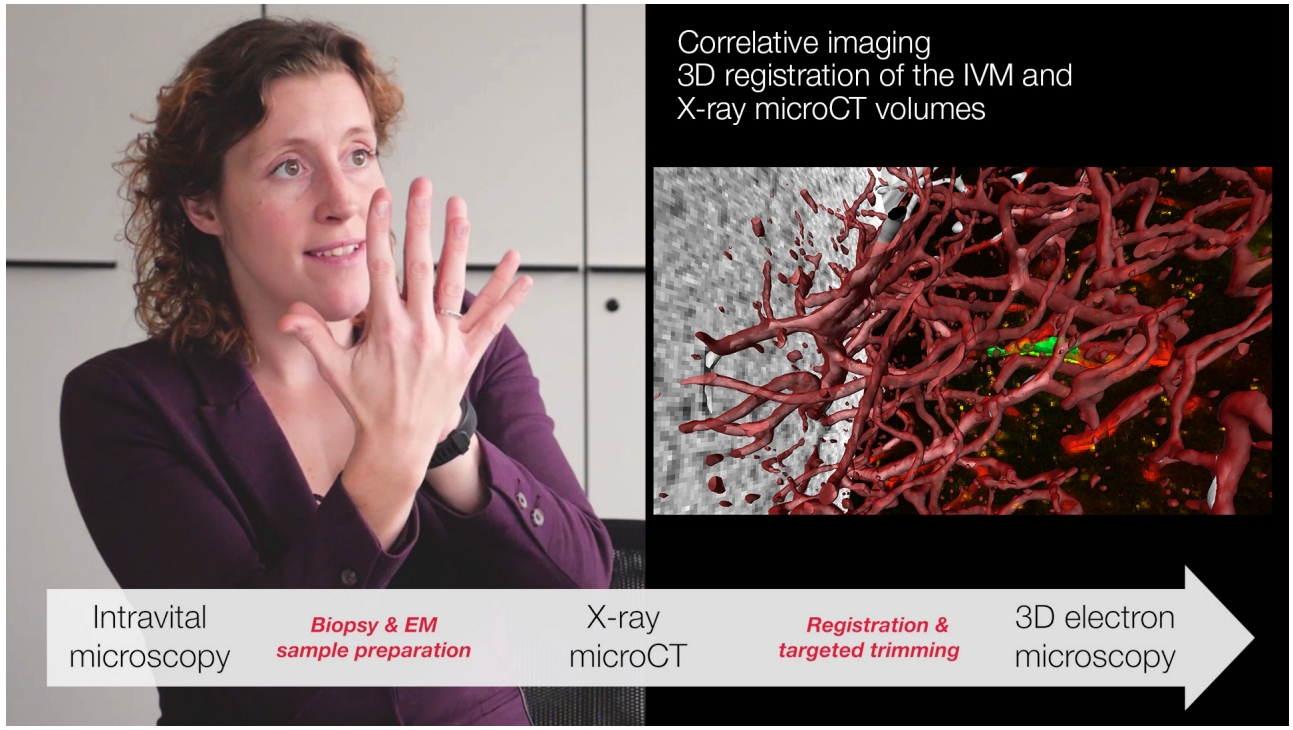


SARS-CoV-2 structure and replication characterized by *in situ* cryo-electron tomography. *Data courtesy of Heidelberg University.*
https://doi.org/10.1038/s41467-020-19619-7

"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)*

Read more



Intravital microscopy imaging is overlaid with microCT data, showing the location of blood vessels in a tissue sample. ***Data courtesy of Dr. Matthia A. Karreman (DKTK, DKFZ, Heidelberg, Germany), Dr. Yannick Schwab (EMBL, Heidelberg, Germany), and Prof. Dr. Frank Winkler (DKTK, DKFZ, Heidelberg, Germany).***

Amira Software is an established, trusted resource for life scientists. It has been cited in an increasing number of open-source peer-reviewed publications over the past decade, highlighted by some of the most prestigious names in life science research and development. Citations include **Heidelberg University** (Klein 2020), **National University of Singapore** (Devalla 2019), and the **Shanghai Institute of Materia Medica** (Sun 2021), to name a few[1,2,3]. These acknowledgments demonstrate that Amira Software's reliability in delivering high-quality imaging data analysis meets the ever-changing needs of life science research and the standards of stringent peer-reviewed publications.

Amira Software is not only a powerful imaging analysis toolbox; it is accompanied by a professional service team that is committed to helping pharmaceutical researchers reach their goals. With cutting-edge software updates and hotline support, as well as professional training, expert consulting, and custom development, Thermo Fisher Scientific will partner with your pharmaceutical team in all stages of assay development.

Watch testimonial

"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*

Current challenges in early research and development

The pharmaceutical industry is growing rapidly, investing more than $80 billion in research and development, or 10 times what the industry spent even 40 years ago, according to the **Congressional Budget Office** (Austin 2021)[4]. This exponential growth has resulted in 60% more drugs being approved annually by the Food and Drug Administration (FDA) compared to the previous decade. As life science research advances, so does the intricacy of imaging datasets.

Pharmaceutical research and development teams are under incredible pressure to deliver stable, efficient, and safe drugs. They must do this quickly, too: the average allotted time for preclinical trials is only about 31 months. Research and development conducted during this stage is crucial since preclinical development expenditures also account for as much as 31% of a company's total expenditures on drug research and development, equating to roughly $474 million per new drug.

Shepherding a prospective drug through clinical trials and FDA approval relies heavily on the detailed biological and chemical analyses performed during the research and development phase.

Condensed R&D timelines, the ever-increasing intricacy of datasets, and the need to reduce manual steps and automate the drug discovery process, all emphasize the need for cutting-edge, reliable, and automated 2D-5D software for biological imaging analysis: Amira Software. research and development. Therefore, a solution that reduces manual steps and automates the drug discovery process is imperative for accuracy as well as timeliness and cost-efficiency.

More investment in R&D

More drugs approved

Increased pressure to ensure accuracy, efficiency, and speed in development

Getting to clinical trials and, ultimately, FDA approval relies heavily on detailed biological and chemical analyses performed during R&D

How Amira Software supports pharmaceutical research and development

Empower your lab with a comprehensive imaging analysis toolbox

Amira Software is a powerful 2D to 5D platform for visualizing, segmenting, manipulating, and understanding life science imaging data. This multifaceted software solution offers native compatibility with an abundance of imaging modalities, customizable workflows, and deep learning capabilities.

Further reading from **"Protocols for Generating Surfaces and Measuring 3D Organelle Morphology Using Amira"** by E. Garza-Lopez et al.:

"Amira [Software] provides interactive high-quality volume visualization with orthogonal and oblique slices, volume, and surface rendering, and isolines and isosurfaces for more advanced customization [28]. Following segmentation, Amira [Software] provides post-image processing and analysis, including colocalization, photobleaching correction, and 3D visualization. While Amira [Software] is user-friendly, it allows advanced users to control the statistical analyses by customizing protocols through MATLAB scripts and by outputting data to Excel."

Accelerate your time to data and time to market

With ready-to-use recipes and Artificial Intelligence (AI)-powered automated processing tools, Amira Software supports faster image analysis by significantly reducing the number of manual steps and the overall amount of tedious manual labor. It can also execute challenging feature identification and improve the accuracy of the analysis.

From **"Supervoxel-Based Segmentation of Mitochondria in EM Image Stacks with Learned Shape Features"** by P. Fua et al.:

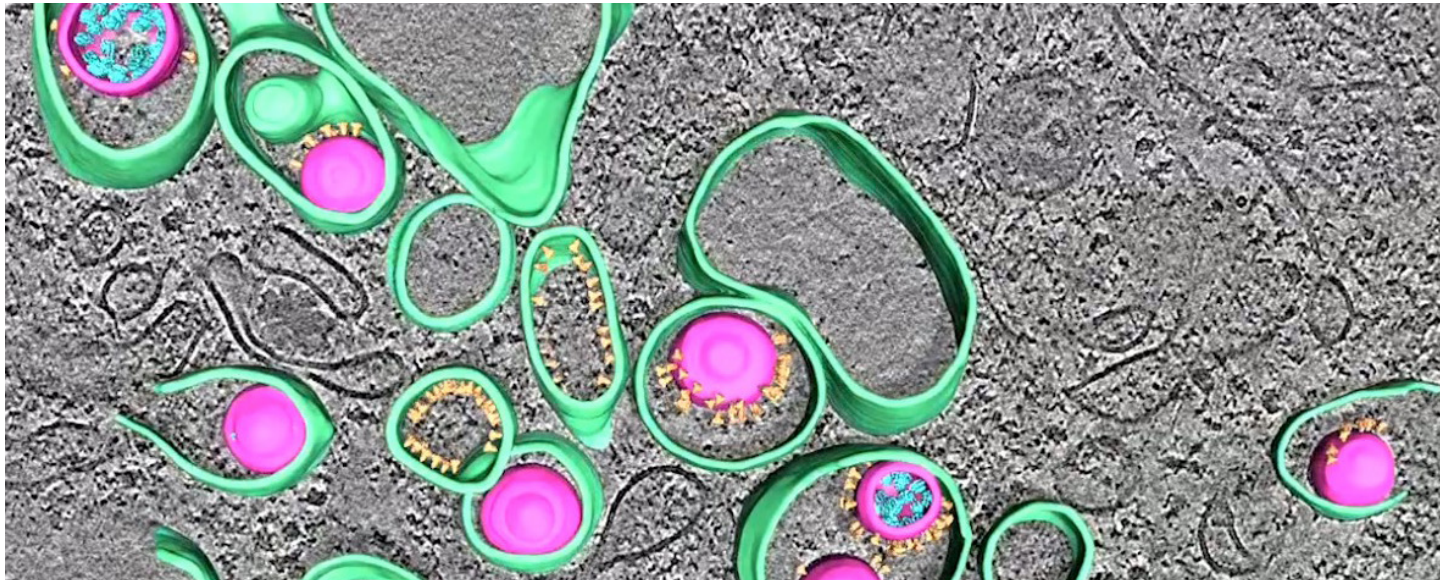
"Analyzing such an image stack by hand could require months of tedious manual labor and, without reliable automated image-segmentation tools, much of this high-quality data would go unused."

Deep learning to automate your image segmentation

Amira Software has built-in support for deep learning models and includes a ready-for-use Python environment. By creating automated workflows, Amira Software supports scientists with faster image analysis and reproducibility, reducing the number of manual steps and lowering the learning curve for non-experienced users. Deep learning models accelerate and improve the segmentation and the interpretation of complex or large datasets.

Deep learning uses for non-experts:
Easy access to a deep learning interface and modules, for which no Python skills are required.

Deep learning uses for experts:
A customizable and extensible platform.



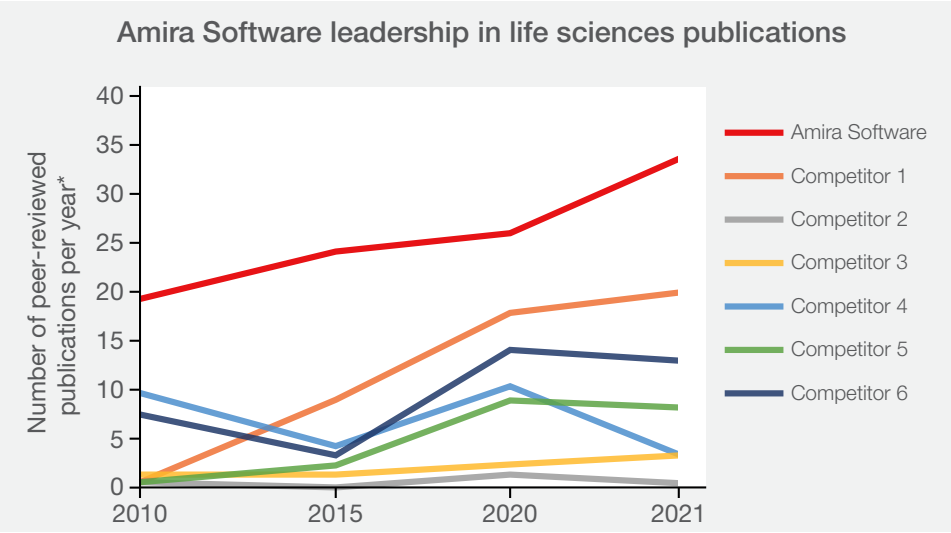
The Department of Infectious Diseases-Virology, Heidelberg University, Heidelberg, Germany used Amira Software deep learning tools for segmenting cell organelles after training on a subset of full volumes.

Amira Software's growing leadership in life sciences

Over the past two decades, Amira Software has been consistently ranked as one of the leading commercial solutions for life science applications, with mentions in more than 350 individual, open-source peer-reviewed publications*.

This number illustrates that Amira Software is regularly chosen as a preferred solution to support complex, innovative research questions in life science biomedical domains with a problem-solving mindset.

Life science literature provides a constantly refreshed source of validated, detailed examples of image analysis workflows and methodologies. The demonstrated range of Amira Software's applications can be leveraged by scientists across academia and pharma when developing their own research ideas for drug development.



Source: PubMed NCBI query search = (All times, "Amira AND Software," "Avizo AND software")

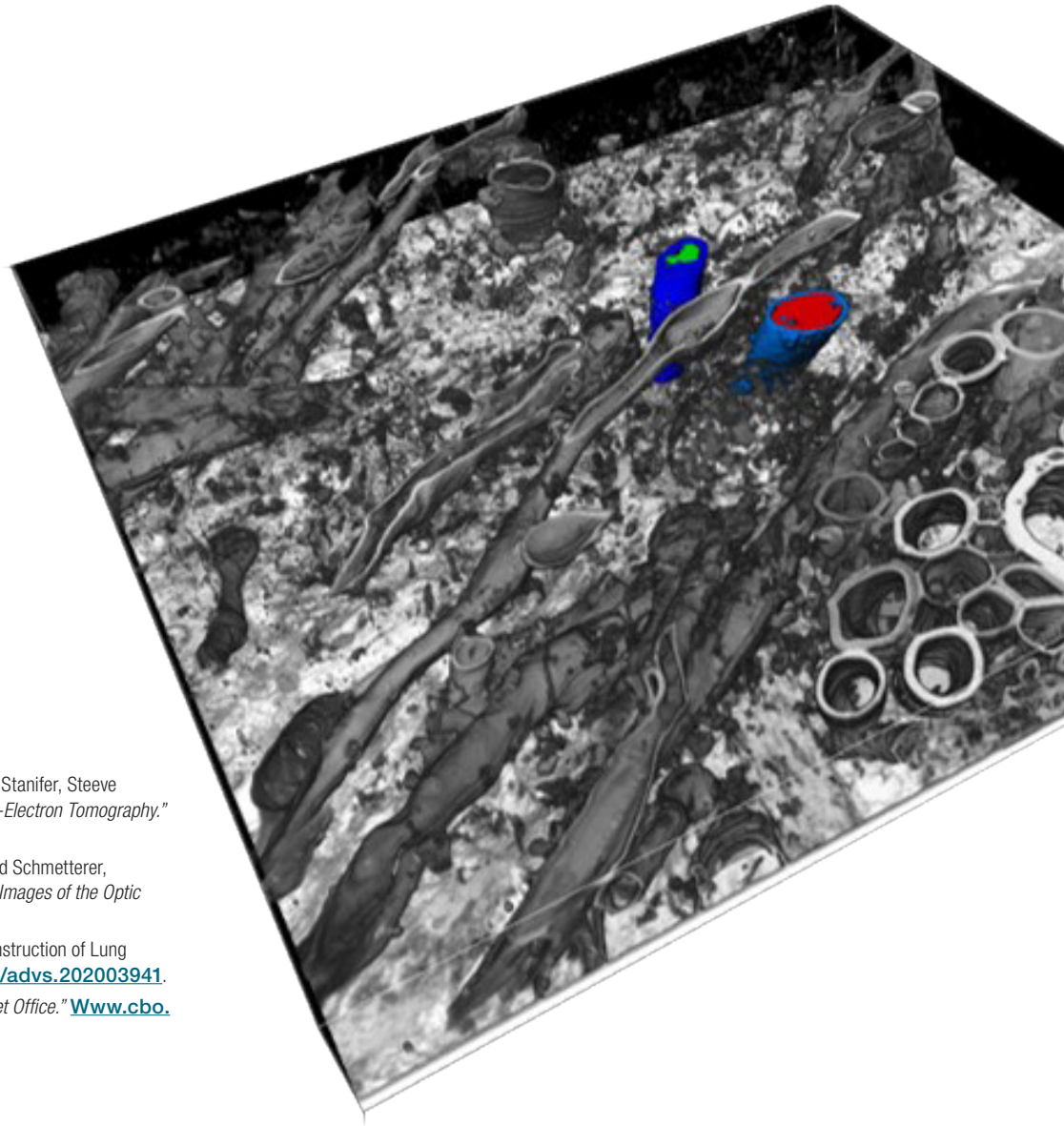
In summary

Thermo Scientific Amira Software is a comprehensive imaging analysis toolbox for pharmaceutical and life science researchers who seek to accurately observe their findings with unparalleled resolution formatting, at almost any scale. Amira Software allows researchers to push the limits of their data imaging and analysis.

In pushing these limits, scientists can better understand how cells function and interact with drugs. They can locate and pinpoint physiological responses to pharmaceuticals, correlate data from multiple modalities to visualize physiological responses,

and then scale their data to meaningfully understand the impact a drug may have on both macro and micro levels. This versatility is just one aspect of why pharmaceutical researchers trust Amira Software to help advance their research and make breakthrough drug discoveries.

Thermo Scientific Amira Software's wide range of applications, its regard within the scientific community, and its continually improved features ensure that it is always designed for life sciences researchers.



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