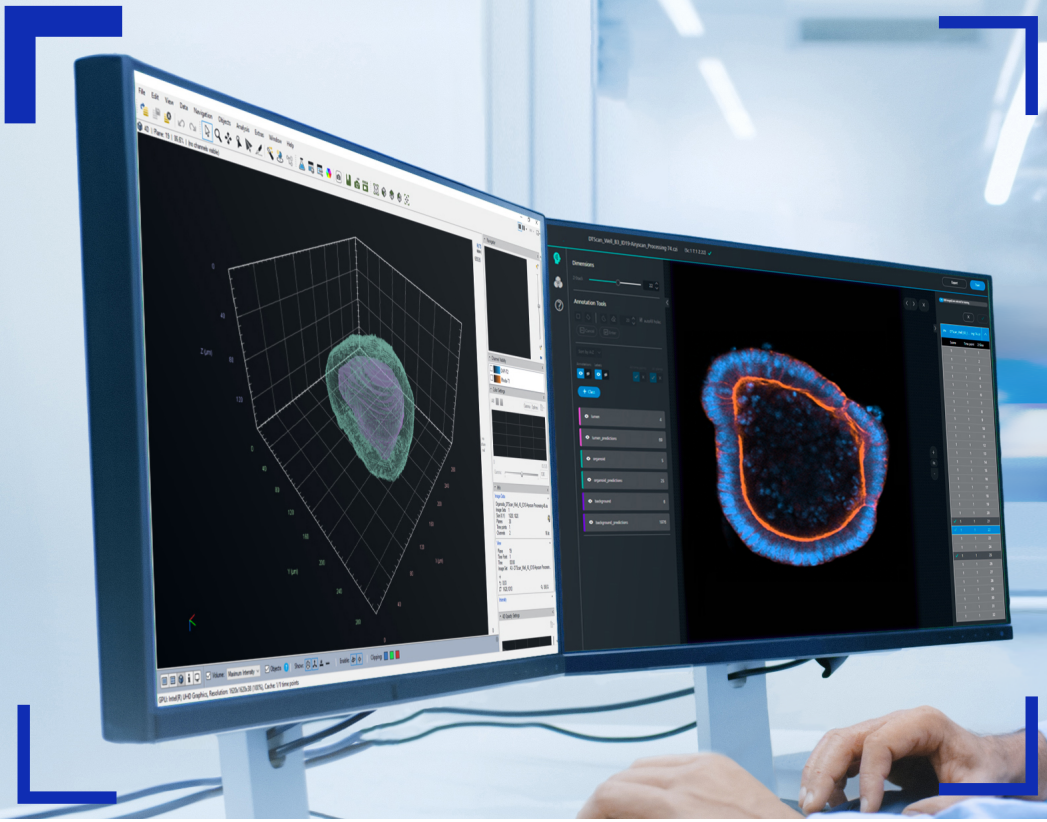
Microscopy Image Analysis Solutions
Customize, Automate, Scale.



ZEISS arivis

Any Image Size, Many Formats, AI-Powered.

www.zeiss.com/arivis

ZEISS

Seeing beyond

Experience Automated Microscopy Image Analysis with ZEISS arivis

No matter the format or size of your image, regardless of the image source, ZEISS arivis can provide multidimensional image analysis and visualization with just a few clicks, and then scale and automate our workflow. Our easy-to-use AI solutions enable you to achieve reliable & robust results with little manual effort.

- User-friendly AI workflows with support for Deep Learning.
- No coding required.
- High-quality image visualization and analysis (including 4D and well plates).
- Optimized use of computational resources.
- Flexible, powerfull analysis pipelines that can incorporate deep learning.
- Automation, scalability, and handling of large datasets made easy.
- Centralized storage and data access for seamless collaboration.

Whether you're analyzing 2D, 3D or 4D images using routine or demanding pipelines running at scale, our software enables streamlined, automated analysis with reliable results. Avoid repetitive manual steps, reduce human bias, optimize computation resources, and save time.

Create AI models on ZEISS arivis Cloud or locally in ZEISS arivis Pro and seamlessly integrate them to create advanced pipelines for image analysis with reproducible results. Immerse yourself in your data with a productive virtual reality solution. Scale up and automate your image analysis to process thousands of images with ease using ZEISS arivis Hub.

A centralized data access and management system facilitates collaboration with colleagues, enabling you to refine and expand shared models, visualize results, and review results in real-time. Our innovative algorithms cater to diverse applications, making ZEISS arivis software a comprehensive solution for microscopy users of all levels.

Analyze Images from Any System or Manufacturer

- Confocal Microscopy
- Widefield Microscopy
- Lightsheet Microscopy
- Electron Microscopy
- Computed Tomography (CT and µCT)
- X-ray Microscopy
- Multiphoton Microscopy

Image Analysis Software For Various Applications

- Cell Biology
- Developmental Biology
- Cancer Research
- Neuroscience
- Immunology
- Translational Research
- Physiology
- Materials Science & Electronics

And many other fields.

Accurate, Reliable and Reproducible Results with AI for Image Analysis

Flexible, Powerfull Image Analysis

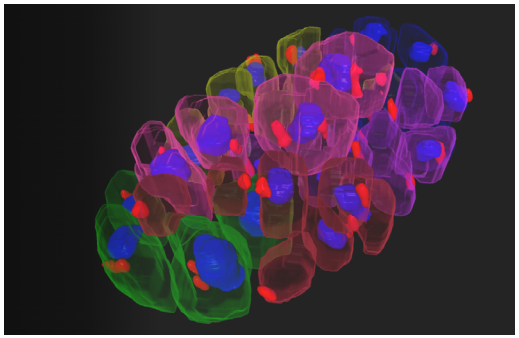
ZEISS arivis Pro is a powerful solution for image analysis and visualization of large data and demanding analysis tasks. It supports 2D, 3D, and 4D image analysis, leveraging user-friendly tools that enable the quick creation of powerfull pipelines. Users can use customized or pre-trained open-source AI models and cater to more specific needs through Python scripting when needed. An immersive and productive analysis experience is enabled using virtual reality (VR). ZEISS arivis software supports many file formats, providing users with a comprehensive image analysis solution.

AI Made Accessible

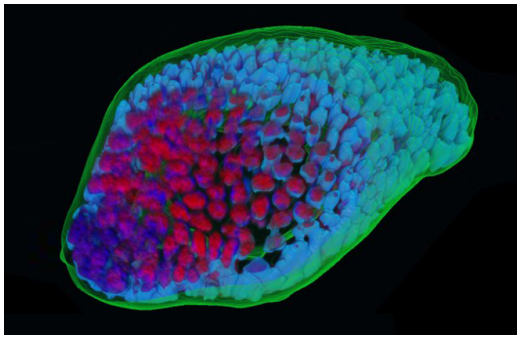
ZEISS arivis Cloud offers easy-to-use Deep Learning tools that enable users to train customized AI models for image segmentation. No coding skills or prior AI knowledge are required. These AI models can be used in the cloud or downloaded for local use and incorporated into image analysis pipelines in ZEISS arivis Pro, ZEN and ZEN core. AI models can also be created and trained locally. With the use of AI, automation of challenging image analysis tasks becomes possible, taking productivity to a new level. Obtain reliable and reproducible results faster and with ease.

Scalable Automated Analysis

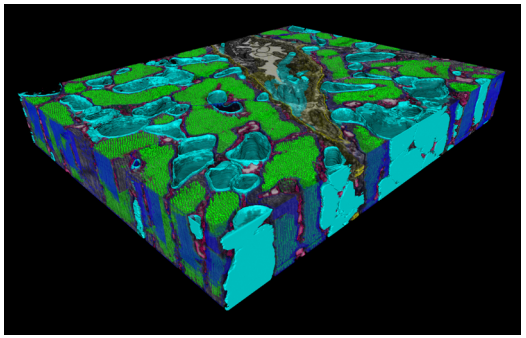
ZEISS arivis Hub offers browser-based access to data stored on both local and cloud servers. Analyze multi-dimensional data and leverage automated workflows for parallelized analysis of thousands of images. Avoid tedious and time-consuming manual analysis. With the flexibility to scale up or reduce computation resources as needed, you can efficiently manage costs. User management allows easy access to centralized data from anywhere, enhancing your result-sharing capabilities.



AI powered segmentation of cells in C. elegans



Organoid 3D analysis powered by a Machine Learning workflow.



Analysis of the subcellular components in mouse muscle tissue, powered by an AI segmentation model.
Sample courtesy of Professor Guorui Huang Ph.D., Ruijin Hospital, Shanghai Jia Tong University School of Medicine.

Image Analysis Made Easy and Intuitive with ZEISS arivis Software Product Line

ZEISS arivis Pro

Analyze and visualize your images

Advanced analysis tailored to your data, regardless of image source, format, or size. ZEISS arivis Pro empowers you to create flexible, multidimensional image analysis pipelines, ensuring reproducible and reliable results. Effortlessly leverage traditional methods or power up with AI models to create and customize pipelines for repeated use, accommodating images of any size, dimension, or modality.

ZEISS arivis Cloud

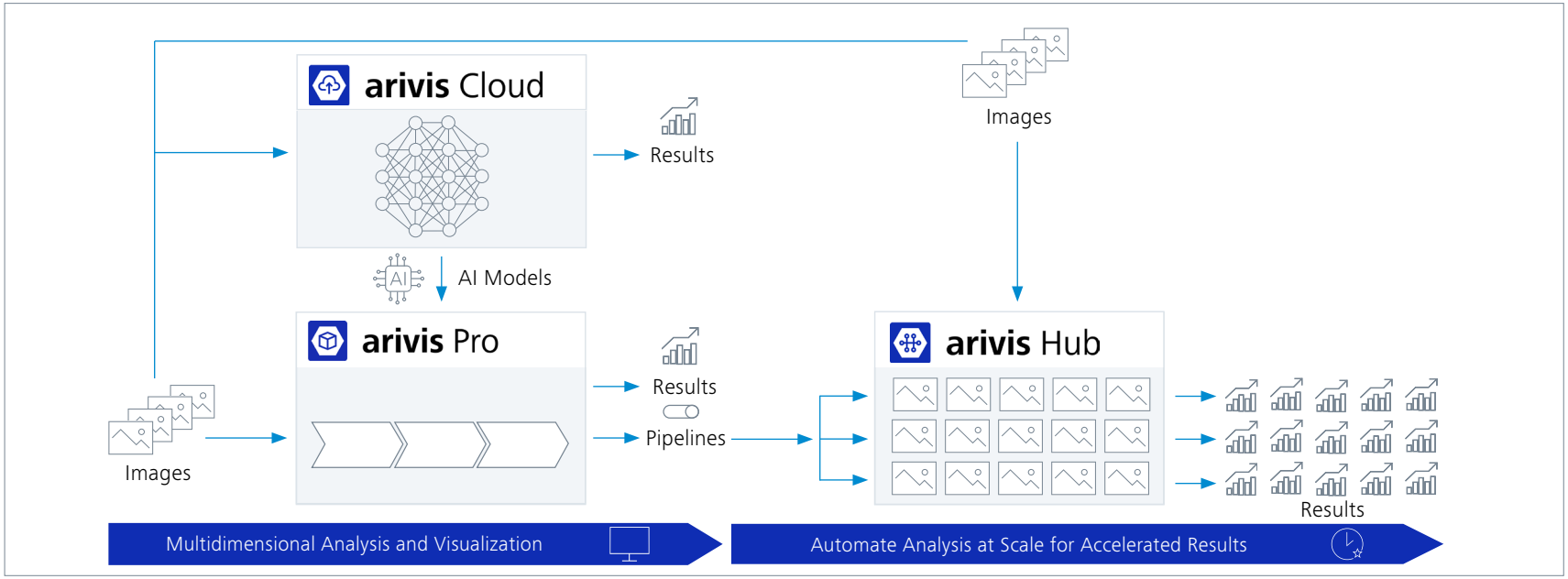
Easily train your own AI models

Unlock the full potential of AI for your image analysis. ZEISS arivis Cloud makes Deep Learning readily accessible for your research. Achieve high-quality segmentation for any structure by simply annotating some examples and training an AI model in the cloud. Prior AI knowledge is not needed. Coding is not required. Use your customized AI models for segmenting images in the cloud or to enable a wide variety of workflows in ZEISS arivis Pro, ZEISS arivis Hub, ZEN and ZEN core.

ZEISS arivis Hub

Scale up to analyze thousands of images

Powerful analysis pipelines that incorporate deep learning models can be run automatically and in parallel, accelerating your analysis and shortening your time to results. Whether datasets are pre-stored or actively acquired, ZEISS arivis Hub efficiently manages images from a diverse range of imaging systems. A centralized system to store images, analysis results and users allows for ease of access and enables efficient collaboration.

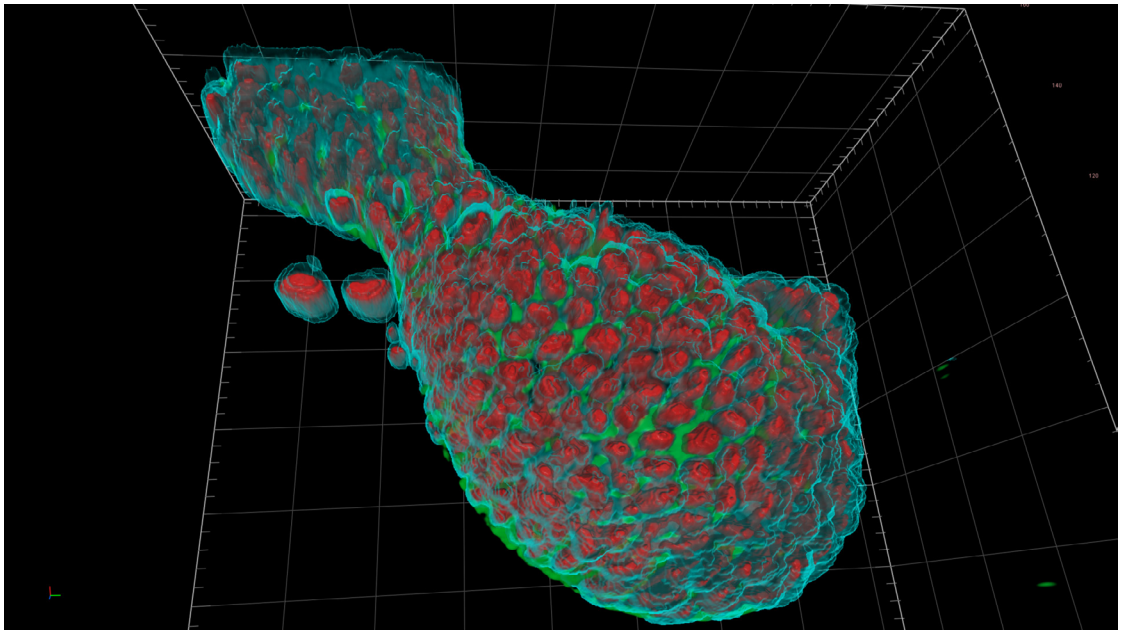


The ZEISS arivis digital ecosystem

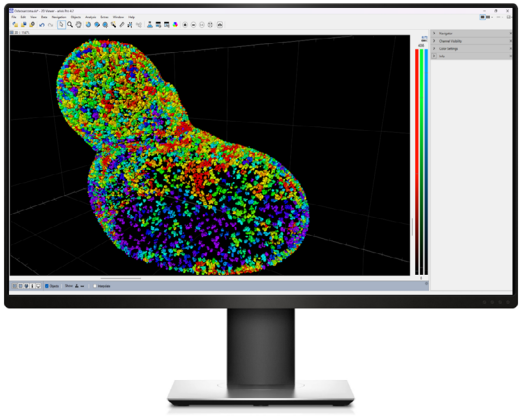
ZEISS arivis Pro:
Powerful Tools for Any Image Analysis & Visualization Tasks

Create Customized Pipelines to Analyze Multi-Dimensional Images of Any Format

Pre-configured pipelines and varied image analysis workflow steps are available for diverse analysis tasks. You can also easily customize pipelines for your specific goals. The software supports and handles over 45 file formats. It takes just one click to repeat your analysis for consistent, quantitative data. Boost productivity, accelerate analysis, and ensure reproducible results with ZEISS arivis Pro.



Organoid imaged with a ZEISS Celldiscoverer 7 system with Airyscan processing. 3D analysis with ZEISS arivis Pro



- **Click-and-play solution for routine or customized workflow**
  Using a flexible toolset, start from scratch or enhance existing pipelines.
- **Combine different operations**
  Denoising, segmentation, filtering and other analysis tasks are easily ordered in a clear pipeline with an interactive preview.
- **Boost your research with AI**
  It is easy to use customized AI models or open-source models (such as Cellpose).
- **No coding needed**
  Start your image analysis today, even if you are not an image analysis expert or programmer. Our interface is intuitive and easy to use. The software provides the flexibility to add scripted code for customized solutions.

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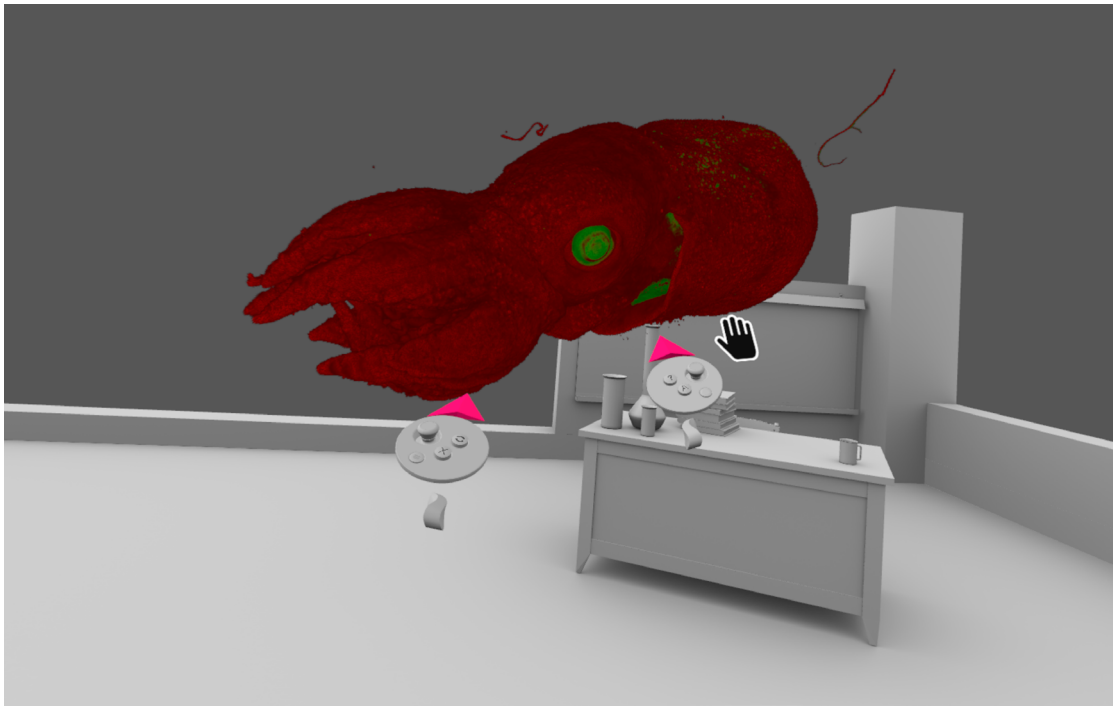
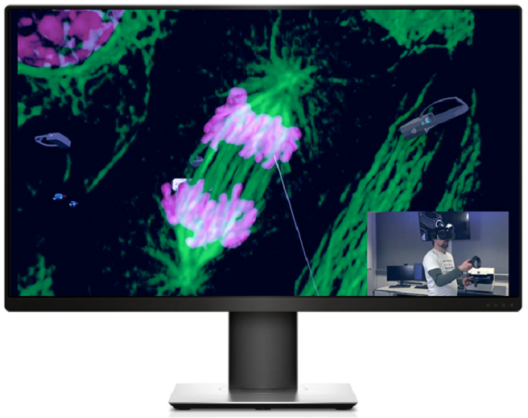
ZEISS arivis Pro VR:
"Walk Through" your Sample for a Unique Perspective

A Unique Way to Explore and Analyze Your Samples through an Interactive Virtual Reality Environment

With this technology, you and your colleagues can easily share and discuss results in real-time, without the need for a mouse, screen, or keyboard. By immersing yourself in the sample, you can control your interactions with your voice or VR tools and gain a new perspective on your data. Additionally, improved tracking and proofreading make the analysis process more accurate and efficient. To showcase your results, VR Stories allows for exceptional presentation and video capabilities.



Octopus sample visualized in an immersive VR environment



- Get a new perspective on your sample with an immersive virtual reality experience.
- Create ground truth 3D annotations for training your own deep learning models.
- Observe details from diverse angles.
- Collaborate with colleagues for a live review of your sample and results.
- Easy voice and hands-on control.
- Especially productive and effective for proof-reading and editing of automatic analysis results.
- Future-proof OpenXR support.

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ZEISS arivis Pro Highlights. Features You will Love.

Enhanced Cell Track Editing and Proofreading in VR

Use ZEISS arivis Pro to quantify cell division and migratory phenotypes, and track changes in 2D and 3D image sets of any size. Use ZEISS arivis Pro VR to accurately proofread automatically generated tracks or segment your image data for a more precise AI analysis in an immersive VR environment. Easily reapply your image analysis pipelines to more datasets.

The Virtual Reality interface offers the ability to modify tracks by cutting, merging, or prolonging them if the automatic tracking algorithm does not yield satisfactory results. This feature is particularly useful for images where distinguishing and separating two closely located objects may be difficult for the automated algorithm.

Automatic Neuron Tracing

ZEISS arivis Pro automatic neuron tracing algorithms enable the analysis of comprehensive structural networks found within 2D or 3D multichannel image sets with just a few clicks. The advanced algorithms and AI-assisted spine tracing effortlessly manage big data, detecting and tracing neurons in large datasets.

- Two state-of-the-art algorithms based on established scientific methods.
- AI-assisted spine tracing module
- Quick preview of analysis results.
- Semi-automatic trace editing.
- Wide variety of trace measurements.
- Extensive visualization and export options.

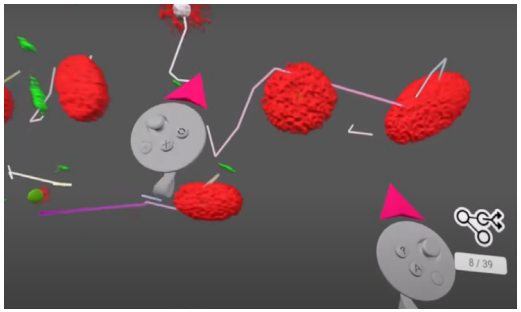
Flexibility in Your AI Analysis

With ZEISS arivis Pro you can import diverse AI models and create a pipeline to segment 2D and 3D image datasets of virtually any size.

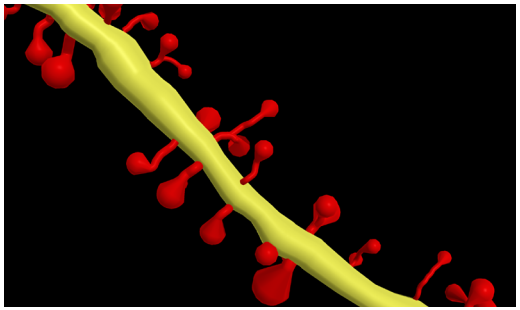
Use ZEISS arivis Cloud or the local training tools to train AI models. AI-assited annotation is also available. Exchange existing ZEISS CZANN models between ZEN and ZEISS arivis Pro, or use open-source models such as ONNX with support for Cellpose and Stardist.

Enjoy the superior performance of arivis Pro with your choice of AI models.

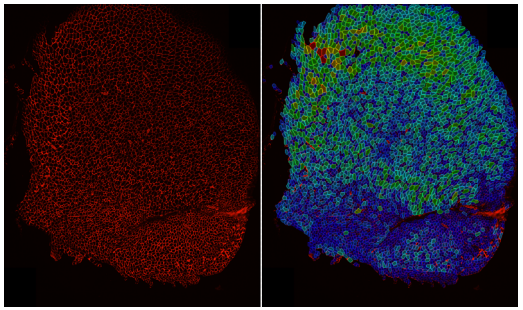
Scan the QR code to learn about more features in ZEISS arivis Pro software.



Tracking result review in immersive VR environment.



Advanced neuronal structure analysis conducted with the AI-assisted spine detection and tracing algorithm. Sample courtesy of R. Thomas and D. L. Benson from Icahn School of Medicine at Mount Sinai, New York, USA.

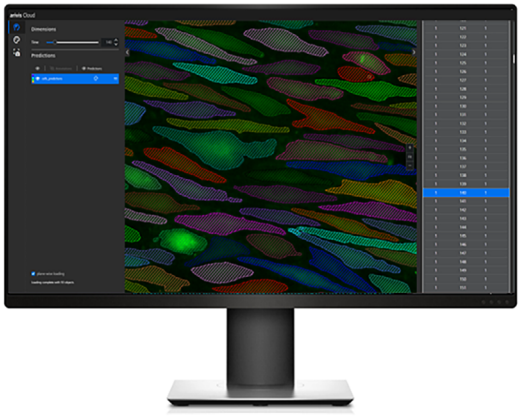


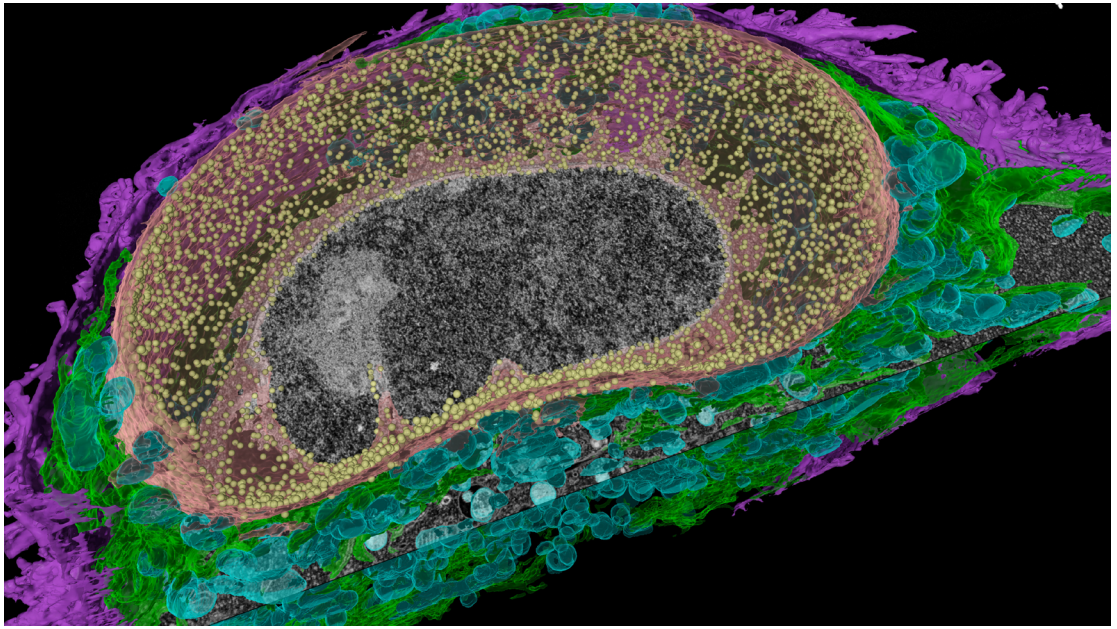
Cell segmentation in ZEISS arivis Pro using the Cellpose-based segmenter.

ZEISS arivis Cloud: Easily Train your Own AI Models

Step into a New Era of Automated Image Analysis with AI Models Trained in the Cloud

Even for tasks previously impossible with conventional methods, Deep Learning does the trick. Easily train customized AI models using ZEISS arivis Cloud to automate image segmentation, the key step to get from images to results. AI-driven image analysis sets a new standard for reproducibility and reliability.





Detailed FIB SEM Volume Electron 3D image, which required AI for enhanced sub-cellular analysis. Courtesy of Anna Steyer and Yannick Schwab, EMBL.

- **Train your own Deep Learning models with ease**
  The intuitive user interface supports novice users and experts in all the steps of training a Deep Learning model. No coding skills or prior knowledge required.
- **Annotate quickly with ease**
  Use the AI-assisted annotation tool to quickly get objects annotated. Only annotate enough to get the model off the ground, review the results, and tweak only when needed. Let AI do the rest.
- **Cutting-edge software**
  The cloud-based solution is always up to date, featuring the latest AI algorithms, and highest data safety measures.
- **Rapid results**
  Accelerate time-to-market by automating routine and repeatable image analysis tasks with the power of Deep Learning models.
- **Work Together**
  Collaborate with your colleagues and peers to refine and expand shared models and training datasets, for increased model robustness, and reproducible results.
- **Integration and scalability**
  AI models trained on ZEISS arivis Cloud can be used directly in the cloud or integrated into image analysis pipelines in ZEN, ZEN core or ZEISS arivis Pro and then scaled up on ZEISS arivis Hub.

ZEISS arivis Cloud Highlights. Features You will Love.

AI-assisted Annotation

Allow ZEISS arivis Cloud to save you considerable time with the AI-assisted annotation tool. Annotate enough examples to get the model off the ground, review the results, and tweak only when needed. Let AI do the rest.

- Annotate quickly by using the AI-assisted annotation tool.
- Easily add, modify, or erase annotations.
- Automatically subtract annotated regions of interest from background annotations.
- Quickly review results side-by-side with your annotations.
- Improve your model iteratively by adding more annotations until the results are satisfactory.

Pixel-based and Object-based Segmentation

Deep learning is remarkably effective in segmenting objects, even against a busy background.
On ZEISS arivis Cloud you can train two different types of AI models:

- Semantic (pixel-based) segmentation: identify all pixels belonging to certain classes.
- Instance (object-based) segmentation: identify and outline each object individually corresponding to certain classes, including cases of touching or overlapping objects.

Simply select the type of segmentation you require at the start of your AI model training.
Both segmentation models can be used widely throughout the ZEISS software ecosystem.
Integrate the AI models into your workflow to follow up with measurements of count, size and shape of objects or with tracking them over time.

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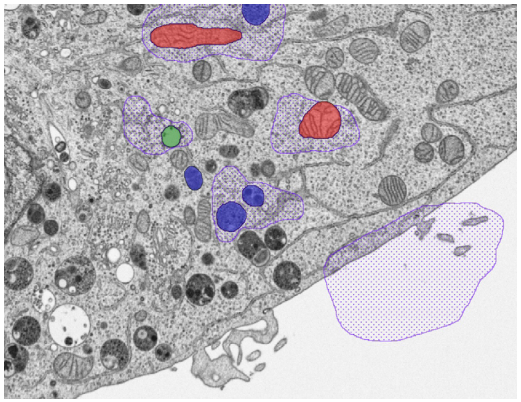
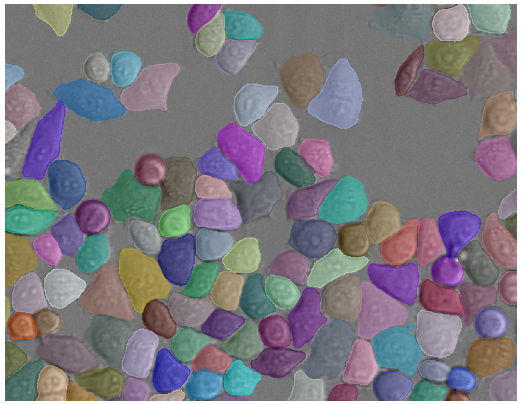
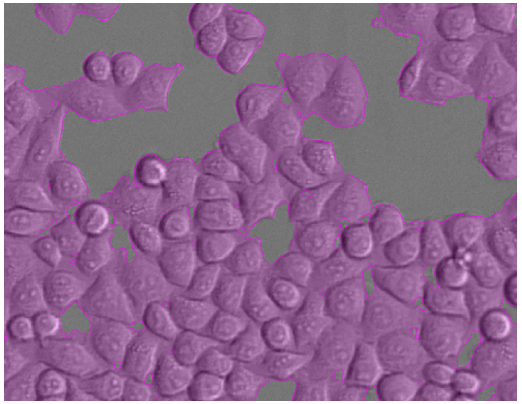
Scan the QR code to sign up for a ZEISS arivis Cloud trial account.



Partial annotation of sub-cellular structures and background in an electron microscopy image.



Instance (object-based) segmentation of individual cells.



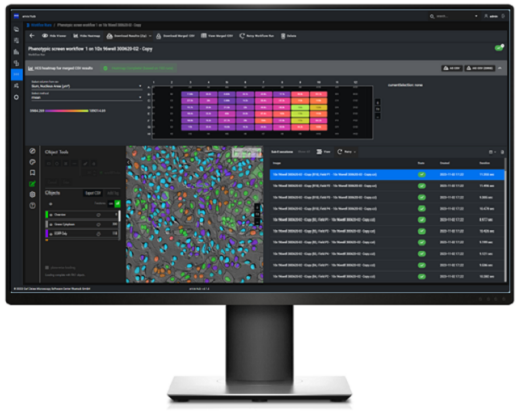
Semantic (pixel-based) segmentation of the entire area covered by cells.

ZEISS arivis Hub:
Break Through the Image Analysis Bottleneck

Scalable, Automated Processing on Local or Cloud Environments

With an ever-increasing amount of imaging data being produced from a range of systems from core imaging facilities to CROs and pharma, it is becoming ever more critical to consolidate imaging data for accelerated throughput, improved efficiency, and faster results.

Avoid data redundancy with data silos and disparate analysis workflows. ZEISS arivis Hub allows for a centralized system offering enhancd storage and data management features, combined with automatic data ingestion and analysis for wide-ranging file types. With optimized resource allocation, you maximize computing potential while minimizing inefficiencies such as wasted space and energy consumption thereby controlling costs.



Intestinal gut organoid cross-sectional view magnified 20X on ZEISS Celldiscoverer 7 and analyzed with ZEISS arivis software family. The image highlights cell layer nuclei and luminal nuclei.

- **Automated Workflows**
  Automatic folder watching detects and processes your images with automated analysis pipelines reducing your time to results.
- **Scalable Analysis**
  A system that grows. Add additional modules and parallel processing power to suit your needs.
- **Collaboration**
  Web-based access allows for the easy sharing of images and analysis data.

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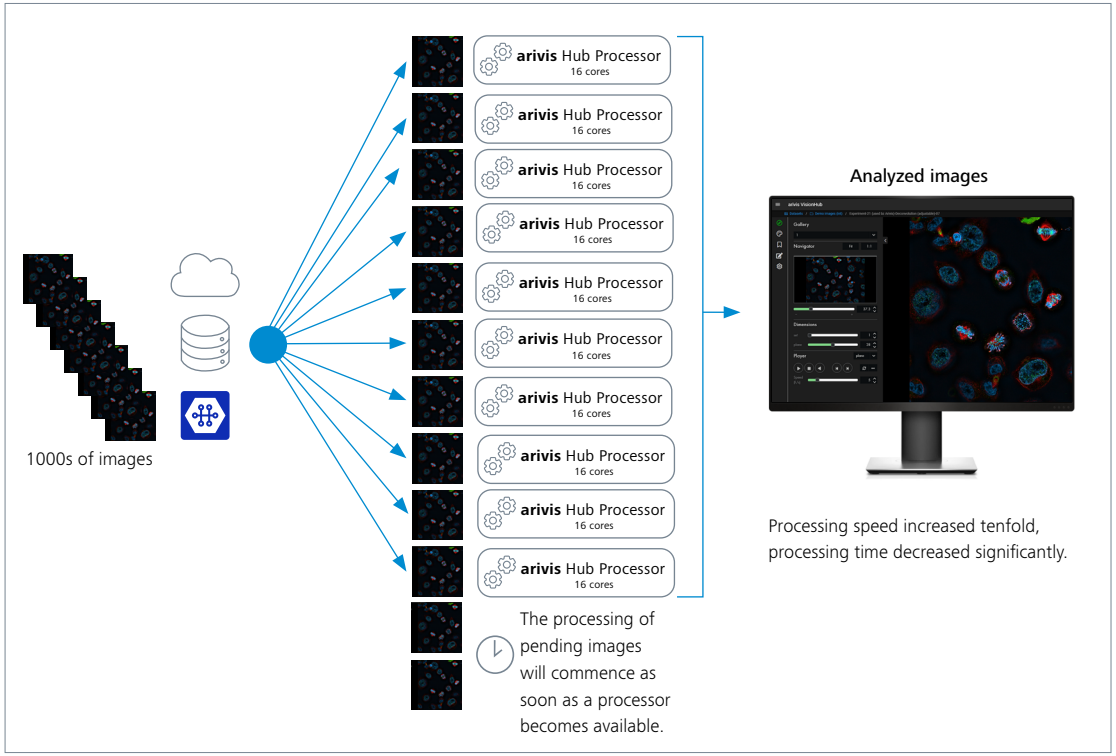
ZEISS arivis Hub Highlights. Features You will Love.

Parallelized Batch Processing

ZEISS arivis Hub is built to handle the scale and volume of modern microscopy research data efficiently. Deployment of multiple processing machines allows for the running of large-scale experiments by executing multi-dimensional analysis of your images in parallel. The option to scale these processors up and down allows for faster turnaround times while controlling resource usage and cost.

- Customized AI-powered image analysis pipelines created in ZEISS arivis Pro can be easily imported to ZEISS arivis Hub for scaled and automated analysis.
- Handle large datasets with ease.
- Optimize computing resources offsite and onsite.



Scaling up image analysis with ZEISS arivis Hub

High Content Analysis

Drug discovery demands advanced image analysis methods such as screening against a broader view of cell or tissue phenotype, scalable from 2D to 4D. Train an AI model using ZEISS arivis software in the cloud or locally, and automate image analysis to save time, reduce human bias, and for consistent results.

1. Integration

- Flexible integration of robotics and external hardware via instrument manufacturer APIs.
- Create your own customized hardware and software solutions with our Solutions Lab experts.

2. HCA & AI, Local and Server-based Scale-up

- Automated workflows for seamless analysis of large datasets.
- Powerful AI-driven image segmentation and analysis capabilities at your fingertips.
- Live-cell imaging and label-free analysis.
- Well-plate analysis, heatmaps, stats and more.
- Seamless integration with data storage and processing infrastructure.
- Parallelized batch image analysis, cloud or on-site deployment options.

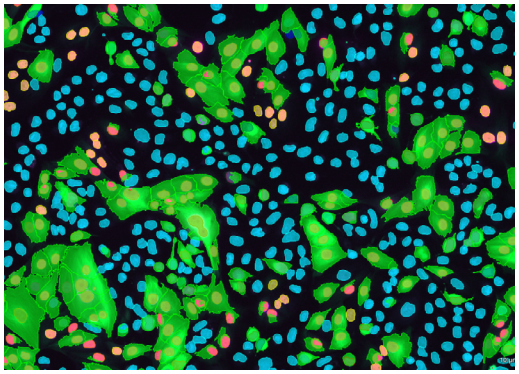
Advanced Analysis with ZEISS arivis

DNA Foci Assay

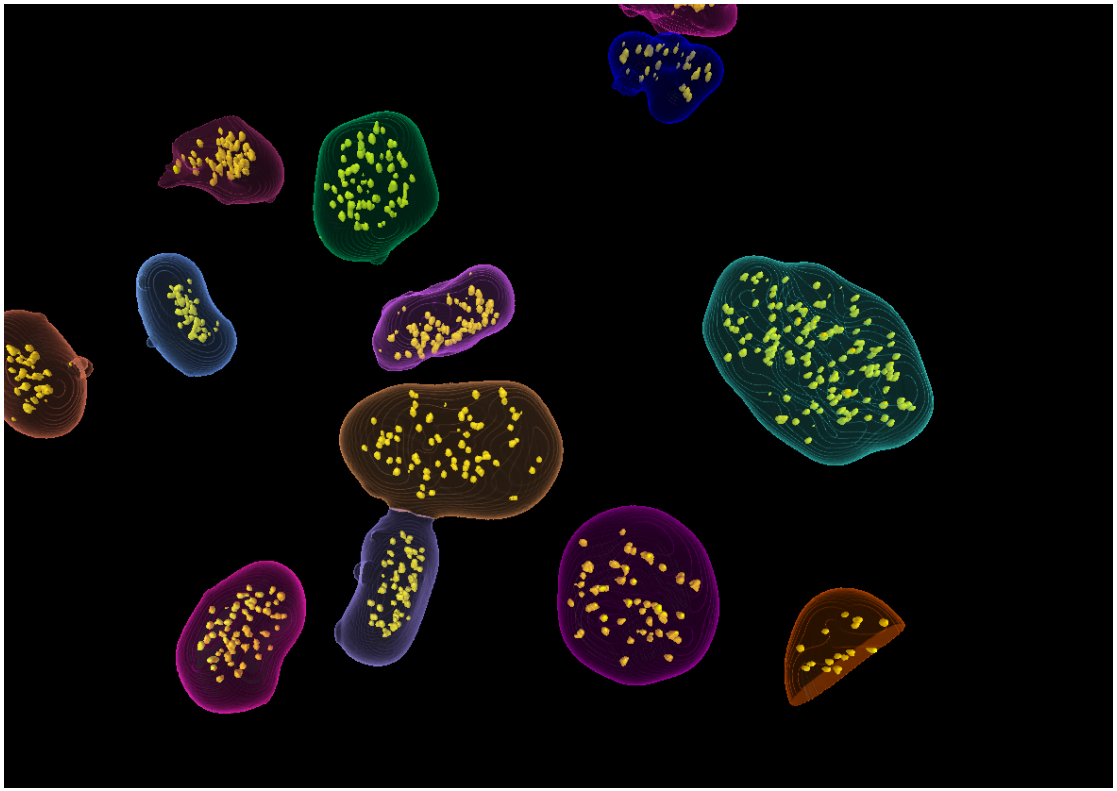
Segment foci and nuclei separately in 3D with either pre-trained or customized AI models. Once accurately segmented, define and quantify relationships for comparison across diverse genetic backgrounds, drug treatments, or other conditions.

Phenotyping Screening

Easily monitor changes in cell phenotypes across various drug treatment conditions at single-cell and well-plate level. The use of AI in the processing workflow ensures reproducible and reliable results across your full screening experiment.



Phenotypic Screening: Cell populations are identified based on nuclear and cytoplasmic marker combinations.

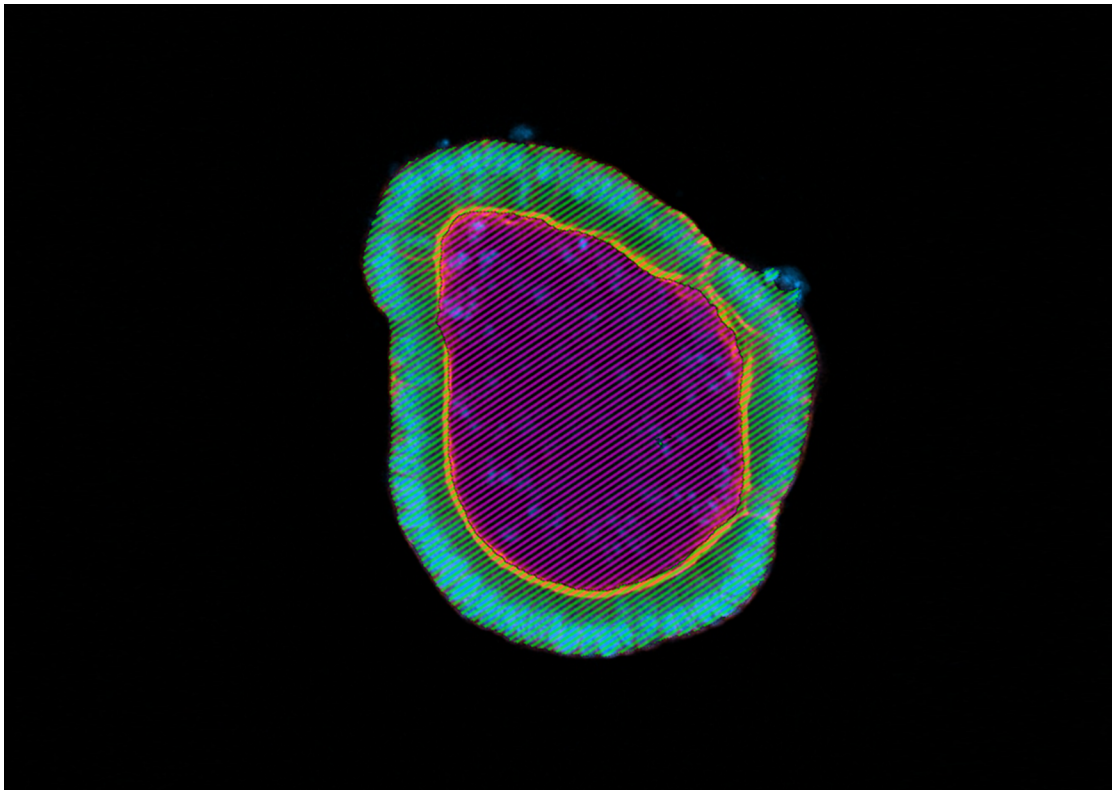


3D represetation of segmented foci (yellow) inside nuclei (random colors)

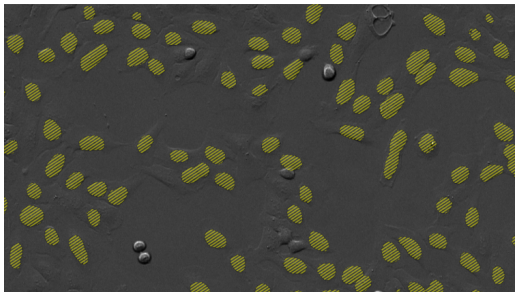
Advanced Analysis with ZEISS arivis

Organoid Volume Quantification
Analyze your organoids for changes in cell layer formation and single-cell effects with AI. Reliable segmentation allows for improved downstream quantification of how organoid growth and differentiation are affected in toxicity assays, drug screens, and disease models.

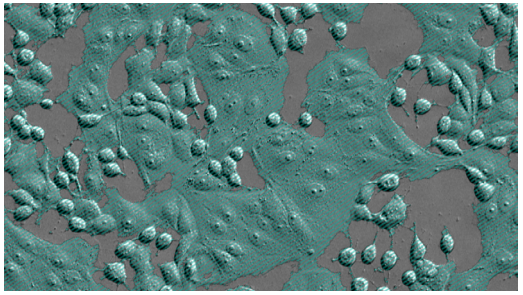
Cell Confluency. Cell or Nuclei Counting
Quantify the confluency of cells, and count cells or nuclei easily with AI. Apply the model to time series and/or multi-well plate data.



Organoid and lumen segmented for volume quantification.



Cell counting



Cell confluency

Did you find these examples inspiring, but perhaps not an exact fit to your needs? ZEISS arivis software can do a lot more. Contact us, our team would love to help you find a solution.

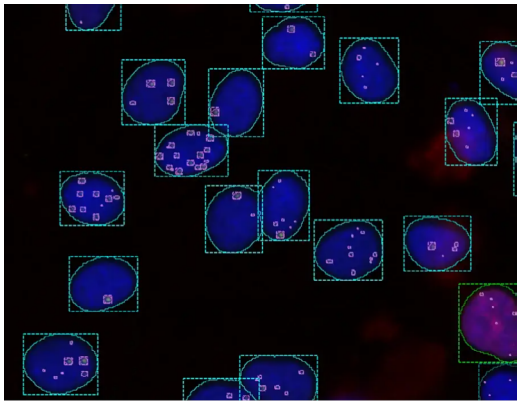
Visit us at:

www.zeiss.com/3d-organoid-analysis

Advanced Analysis with ZEISS arivis

High-Content Genotoxicity

To determine the extent of DNA damage in cells stained with DAPI, measure the signal intensity of foci in two channels. This approach provides a quick and adaptable method for stratifying nuclei according to various parameters to enable a thorough mechanistic analysis of genotoxicity. The pipeline can be scaled up to handle hundreds of samples.



Segmented nuclei (cyan highlights) and segmented foci (magenta highlights) within each nucleus.

Sub-cellular Analysis

Use a Deep Learning model to segment various sub-cellular objects. Annotate enough objects to get the model off the ground despite differing morphology in a certain class. You can use diverse quantitative features from the software, create your own, or import and customize features to classify objects within a certain group.

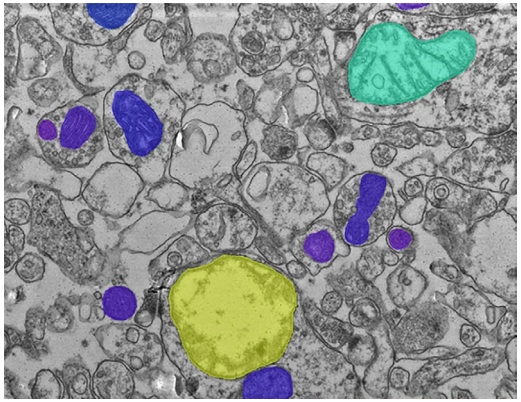


Image courtesy of Dr. Wendy Bautista, MD Ph.D., Barrow Neurological Institute, Phoenix Children's Hospital. Hippocampus tissue section, transmission electron microscopy. The spectrum of the mitochondria phenotypes is reflected in the color of the corresponding objects.

Learn more about high-content genotoxicity.

Visit us at:

www.zeiss.com/genotoxicity

Did you find these examples inspiring, but perhaps not an exact fit to your needs? ZEISS arivis software can do a lot more. Contact us, our team would love to help you find a solution.

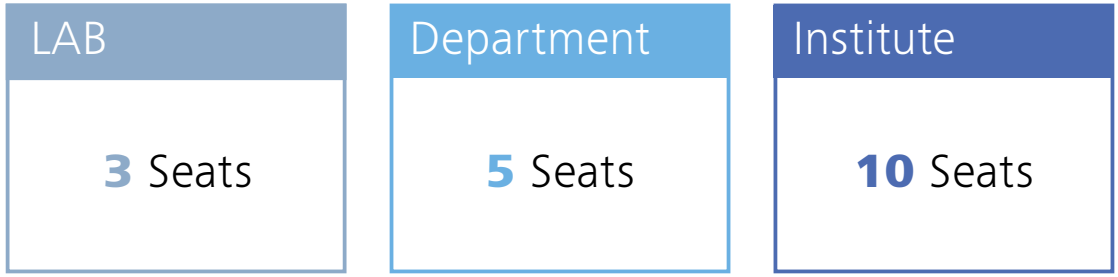
Visit us at:

www.zeiss.com/microscopy/ai-mitochondria

Institutional Licenses

Your Subscription-Based Offering

Streamline your AI-powered, advanced image analysis with subscription-based Institutional Licenses for ZEISS arivis Pro and ZEISS arivis Cloud. Say goodbye to managing individual workstation licenses and enjoy significant cost savings. Floating licenses offer flexible workspace allocation, ensuring optimal resource use. All features are always up to date and available to all users, whether in the lab, on a central processing server, or remotely. Easily adjust software packages and seat counts on a yearly basis as your needs evolve.



Depending on your institution's requirements, you can choose how many concurrent users (seats) you want to license per software package

ZEISS arivis Pro

The annual subscription for ZEI55 arivis Pro includes all arivis Pro modules for advanced analysis of large 3D datasets.

ZEISS arivis Cloud

The annual subscription for ZEISS arivis Cloud makes AI for image analysis accessible with no coding and includes:

- Access to Deep Learning Toolset
- On-going priority expert support
- Continuous and included access to newest features and improvements
- Access to training materials

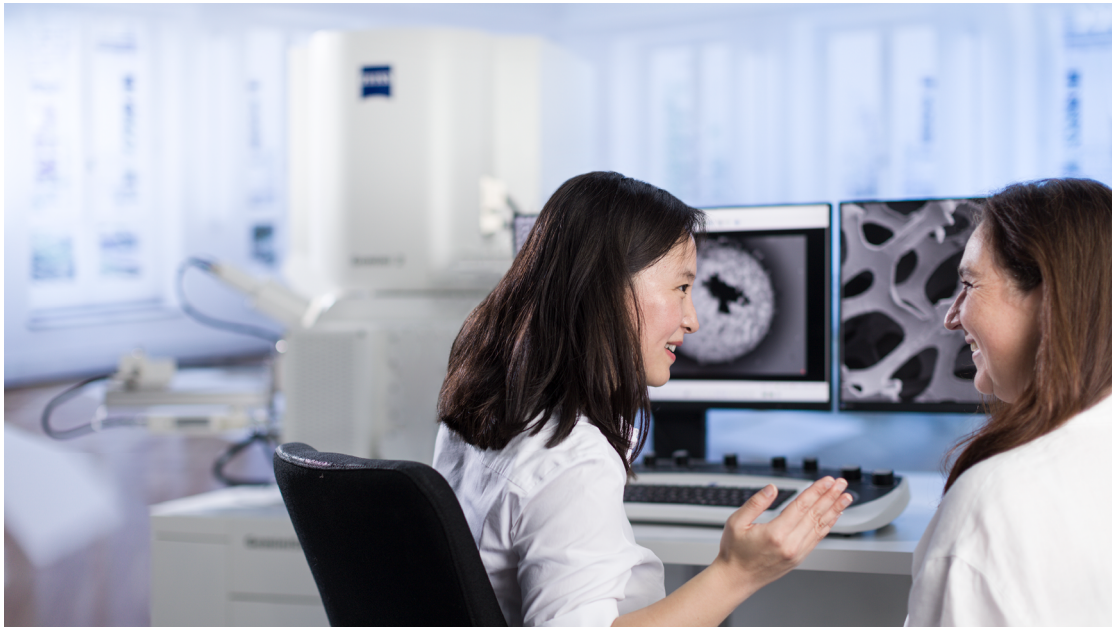
Solutions Lab. Rapid Application Development

Automate and Enhance your Workflows

Are you looking to boost productivity with your microscopes? Regardless of the application, you have specific needs and challenges. Be it in life sciences, materials sciences, raw materials, or industrial R&D, modern microscopy equipment creates massive amounts of imaging data, and you need to process data across length scales.

Imagine a tailor-made platform, which adapts to your unique microscopy needs. Enter the ZEISS Solutions Lab, driving innovation with our customized microscopy software solutions for automation and workflow integration.

Our solutions allow for feedback loops built within the software to automate workflows from image acquisition, via machine learning segmentation, image analysis, and statistical calculations to final reporting and data export. You can combine or streamline multiple analysis workflows and integrate robotics, or other automation processes to improve speed and accuracy.



Customized Solutions

Sometimes, creating a customized workflow is the best way to adhere to the needs of your research. Allow our experts to help you by developing an application that is tailored to your specific requirements.

We Help To

- Streamline your imaging process or workflow through automation.
- Utilize advanced image analysis and correction tools.
- Automate the search for your Regions of Interest (ROI).
- Adapt existing workflows.
- Simplify and shorten tasks and processes.

Contact us and find out how the ZEISS Solutions Lab team of creative experts can help you.

Visit us at:

www.zeiss.com/solutions-lab

Service and Support

For over 175 years, the ZEISS brand and our experience have stood for reliable equipment with a long life in the field of microscopy. Talk to an Expert. Whatever your need, our team would love to help you.

Free Consultation

Allow our team of image analysis and computation experts to help you set up the exact software solution you require. We are always happy to learn from you and to assist you in accelerating your research.

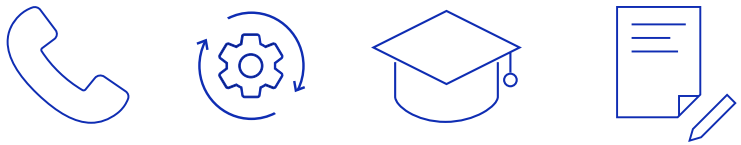
ZEISS arivis Pro and ZEISS arivis Cloud are also offered as Institutional Licenses on a subscription basis. Contact us to learn more.

www.zeiss.com/arivis

Solutions Lab

We are aware that you have specific needs for your research. With the ZEISS Solutions Lab, we offer a customized solution integration that includes all the hardware and software you need. Just tell us what you are looking for, and our team of experts will help you create it.

www.zeiss.com/solutions-lab



Technical details, system requirements, branding and specifications may change periodically as our software continues to evolve. Availability of services depends on product line and location.

Training and Product Information

- We offer free training information, tutorials and videos on our YouTube channel and our website to get you started.
- Product documentation is available in our knowledge base.

Service Maintenance Agreement ZEISS arivis Pro

Purchasing a Service Maintenance Agreement in addition to your software license ensures:

- Two software updates per year.
- Access to tutorials, product knowledge base and customized training options.
- Support from our experts for your specific tasks.
- Compatibility for new modules.

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