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# IN Carta Image Analysis Software



Provides robust, quantitative results from complex biological images and datasets

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# Go from assay to insights quickly and reliably with ImageXpress imaging systems and IN Carta software

IN Carta® Image Analysis Software solves complex image analysis problems utilizing advanced Artificial Intelligence (AI) turning images into data. Easy-to-use workflows help you get to your answers quicker from 2D, 3D, and time-lapse experiments. There is no need for image analysis expertise or tedious tweaking and testing of analysis parameters. Let IN Carta software do the heavy lifting so you can focus on your research.



## Powerful

Guided workflows and scalable batch processing increase productivity and reduce time to answer. Experiments can be set up quickly and computational resources can run analysis of multiple wells in parallel efficiently.



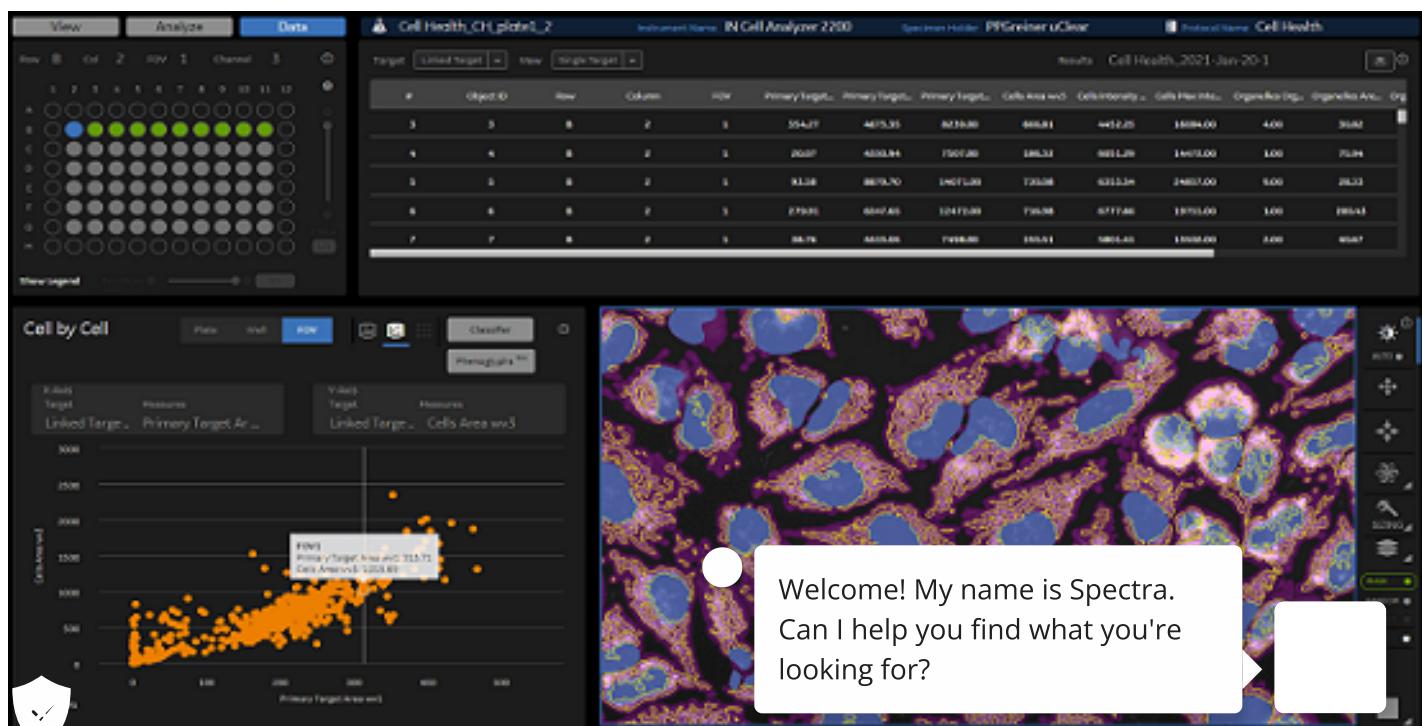
## Insightful

Machine learning helps you leverage more information and increase accuracy in the analysis of high-content screening data to enable new discoveries with confidence.



## Intuitive

Modern user experience and cutting-edge technology minimizes the software learning curve and removes barriers to productivity.





# In Carta Image Analysis Software

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## Features



### Machine learning

Improve image analysis workflow with SINAP and phenoglyphs modules for AI-driven solutions. SINAP uses deep learning for robust image segmentation. Phenoglyphs uses machine learning-based classification to reveal insights from complex datasets.



### Customization

Browse and review images from experiments, create image analysis protocols, process data, and visualize analysis results.



### Batch analysis

Analyze multiple experiments in batch analysis mode with one or more analysis protocols.



### 3D Analysis

Segment and quantify biological structures in 3D. IN Carta VoluMetrics module provides algorithms that operate on voxels when segmenting objects and extracting informative measures.



### Worklists

Browse to a parent directory and populate your worklist with image datasets of interest.



### Monitoring

Monitor the status of all submitted batch analysis tasks and oversee their progression in real time.

## IN Carta SINAP

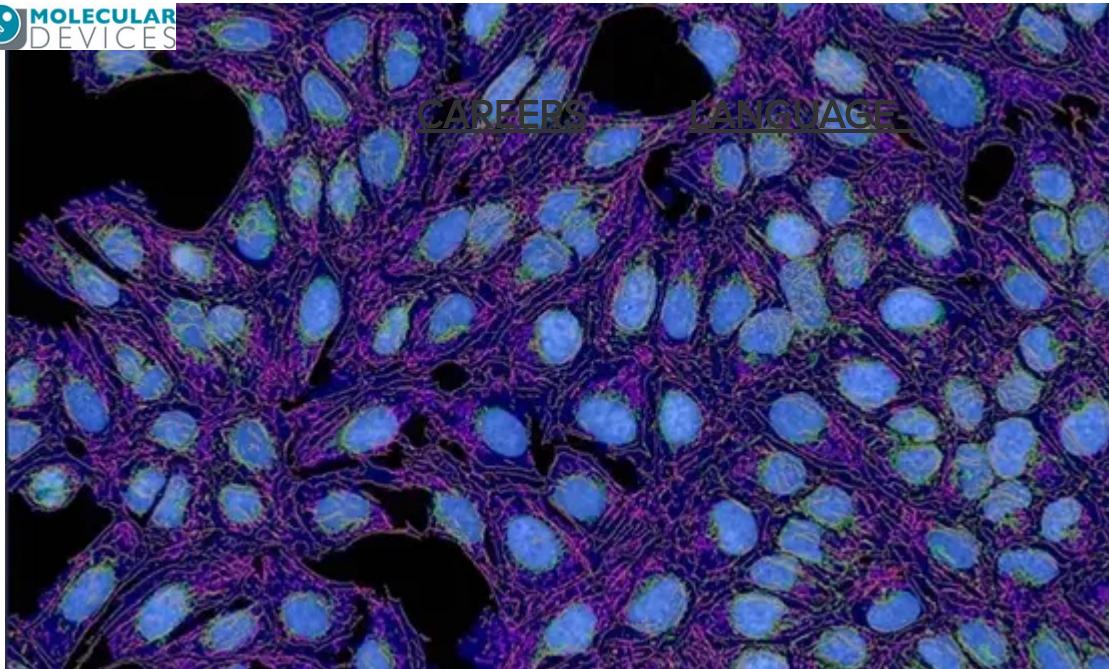
SINAP is a module that uses deep learning algorithms to improve accuracy and reliability of high-content screening assays at the first step in the analysis pipeline—segmentation. It provides better object detection than traditional image analysis methods. Quantitative information extracted at this step is more accurate so errors are not propagated down the analysis pipeline.

*With SINAP, Segmentation Is Not A Problem!*

- Accurate – deep learning can maintain accuracy across difficult to segment samples including highly confluent cells and low signal-to-noise samples
- Reliable – SINAP models can account for high phenotypic variability
- Flexible – a single workflow can deal with a variety of applications and imaging modalities, including challenging fluorescent and transmitted light assays
- Accessible – trained model learns to segment from user to develop an image processing pipeline and optimize the analysis workflow

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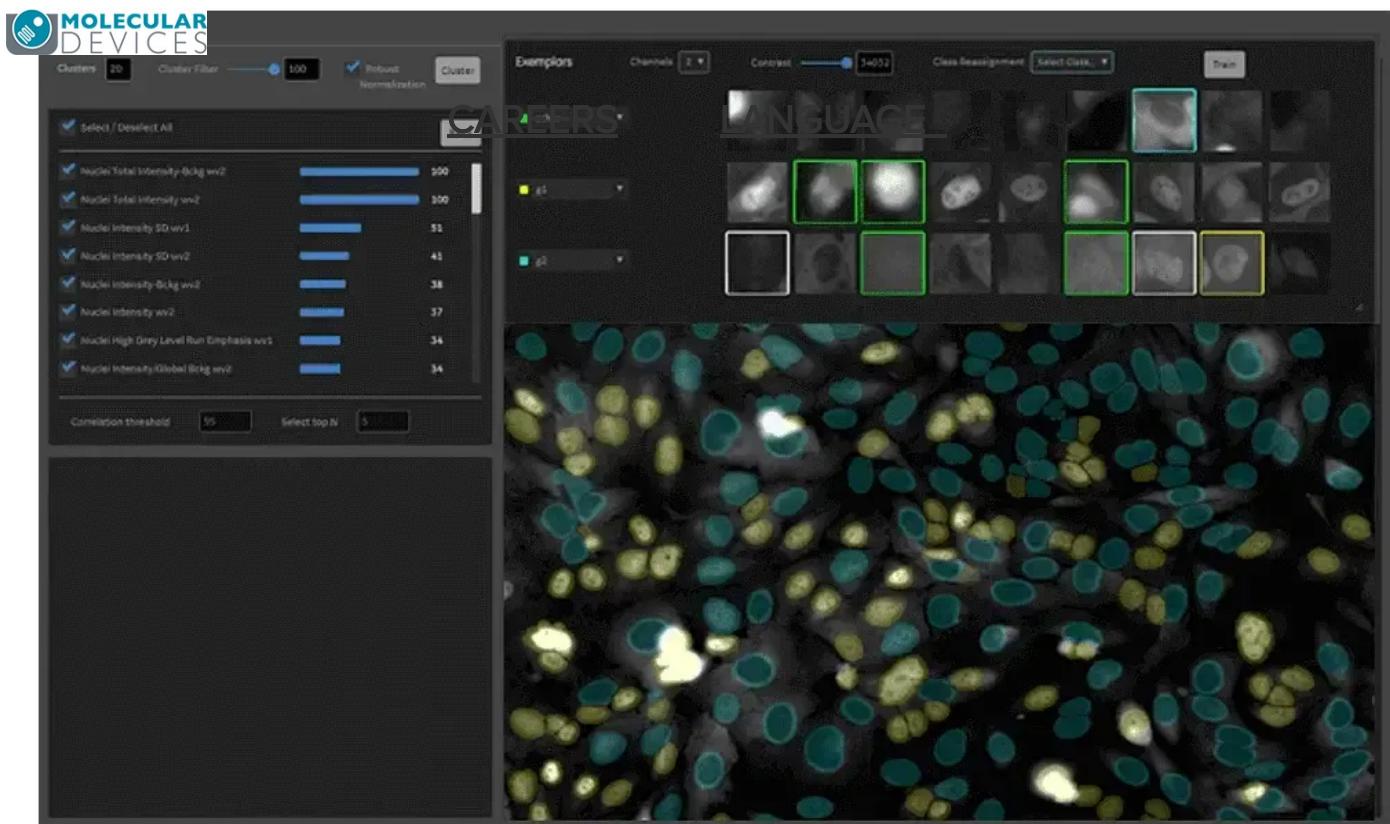
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Composite of segmentation masks for nuclei (blue), endoplasmic reticulum (green), mitochondria (fuchsia)

## IN Carta Phenoglyphs

IN Carta® Phenoglyphs™ Software Module uses advanced machine learning to classify segmented objects. Using many hundreds of cellular features that can be analyzed simultaneously, a comprehensive phenotypic profile is created and can be applied throughout an entire screening workflow. This multivariate approach to classification provides accurate characterization of object populations allowing users to resolve subtle phenotypic changes induced by drug treatment or genetic modification. It can be utilized across many biological targets including organoids, cells, spheroids, and more.

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- Robust – the novel unsupervised step in the workflow quickly builds a large unbiased training set that captures the variance in a class and produces models that are less subject to overfitting and misclassification
- Comprehensive – a data driven approach that starts with an unsupervised clustering to find patterns in the data and highlight subpopulations without prior knowledge of what phenotypes may exist
- Optimized workflow – machine learning automatically chooses the optimal set of descriptive features to form a complex set of rules to stratify classes. Classification is achieved by simply confirming or correcting the algorithm's predictions until it learns the right behavior.

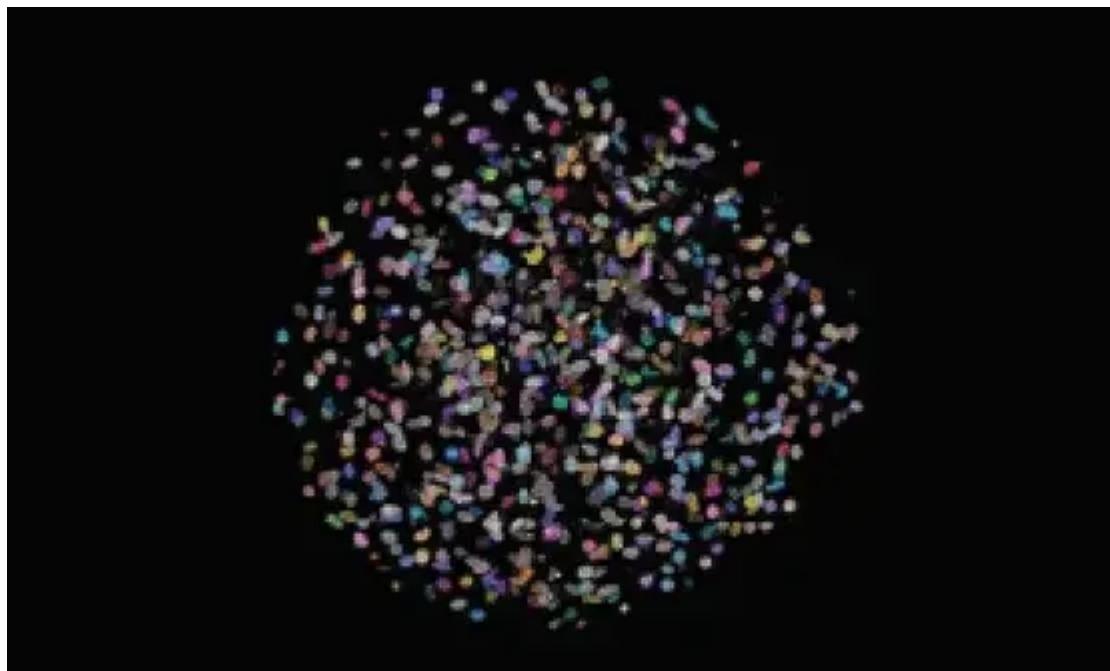
## IN Carta VoluMetrics

3D biological models that more accurately mimic *in vivo* organs and tissues show great potential as tools to improve the understanding of disease and probe for potential therapies. IN Carta VoluMetrics is a 3D image analysis module that extends IN Carta software's functionality with the ability to segment and quantify biological structures in 3D.

IN Carta VoluMetrics provides algorithms that operate on volume-based informative measures. This provides a better representation of distributions compared to individual Z-plane analysis where a single Z-plane is a rough approximation.

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*Random color segmentation masks that assess segmentation quality of touching objects in densely packed spheroids*

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## ImageXpress® Confocal HT.ai High-Content Imaging System

Powerful multi-laser light sources, a deep tissue penetrating confocal disk module, water immersion objectives and modern machine learning analysis software

- Ideal for highly complex cell-based and 3D assays
- Seven-channel high-intensity lasers generating brighter images with higher signal-to-background ratio
- Spinning confocal disk technology for deeper tissue penetration, resulting in sharper images with improved resolution
- Water immersion objectives offering up to quadruple the signal at lower exposure times for greater sensitivity and image clarity

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## Overcome the challenges of high-content cell analysis through AI/machine learning

Artificial intelligence (AI) is finding its way into many aspects of modern life, from autonomous vehicles to voice-powered personal assistants, and even the creation of art. But it...

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