

ImageXpress Confocal HT.ai

High-Content Imaging System

Discover More

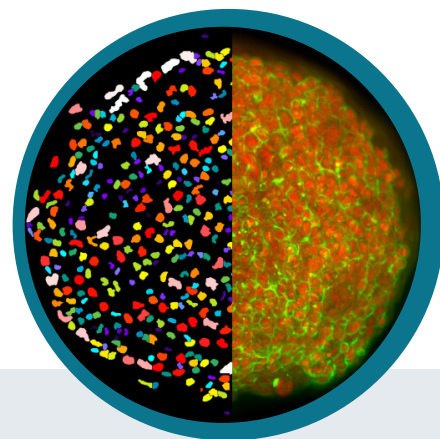
Eliminate the noise and discover more insights

The ImageXpress Confocal HT.ai system increases image intensities and throughput for 3D organoid and spheroid assays, revealing insights other technologies miss.



The ImageXpress® Confocal HT.ai High-Content Imaging System utilizes a seven-channel laser light source with eight imaging channels to enable highly multiplexed assays while maintaining high throughput by using shortened exposure times. Water immersion objectives improve image resolution and minimize aberrations so scientists can see deeper into thick samples.

The powerful combination of MetaXpress® software and IN Carta™ software simplifies workflows for advanced phenotypic classification and 3D image analysis with machine learning capabilities and an intuitive user interface.



Key capabilities

- **Eight-channel, seven laser light source** generates brighter images with a higher signal compared to LED light sources, while cutting acquisition speed in half for most 3D organoid and spheroid assays.
- **Spinning disk confocal technology** reduces haze from out-of-focus light for deeper tissue penetration, resulting in sharper images with improved axial resolution.
- **Automated water immersion technology** offers up to 4X the signal for greater sensitivity and image clarity without sacrificing speed.
- **IN Carta software** utilizes Modern Machine Learning with accessible, guided workflows for high-content image analysis.

Discover more with accuracy

- AgileOptix™ spinning disk technology removes out-of-focus light and provides deeper insights into thick tissue samples
- Machine learning reduces classification error, enhancing high-throughput screening and analysis of complex models
- Quickly image and identify rare cellular and intracellular events
- Unbiased cell segmentation and phenotypic feature extraction

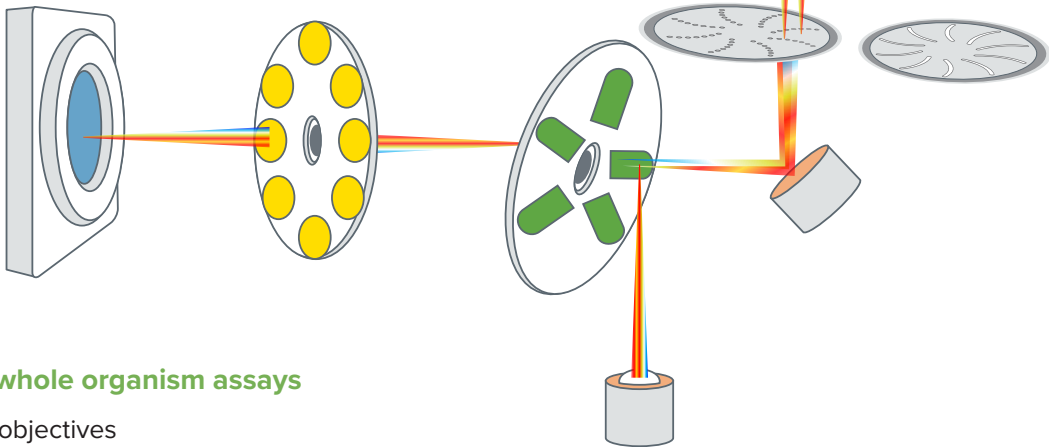
Discover More with accuracy

Exclusive AgileOptix spinning disk technology offers the right software-selectable configurations for your research

The ImageXpress Confocal HT.ai system features AgileOptix technology. Confocal options, including five swappable disk geometries and seven laser excitation channels, make it easy to select and configure the system to ensure the best results for a specific assay. Intelligently designed optics provide increased sensitivity with high-powered lasers, and a sCMOS sensor.

Eight imaging channels

- DAPI
- CFP
- FITC
- YFP
- TRITC
- TexasRed
- Cy5
- Cy7



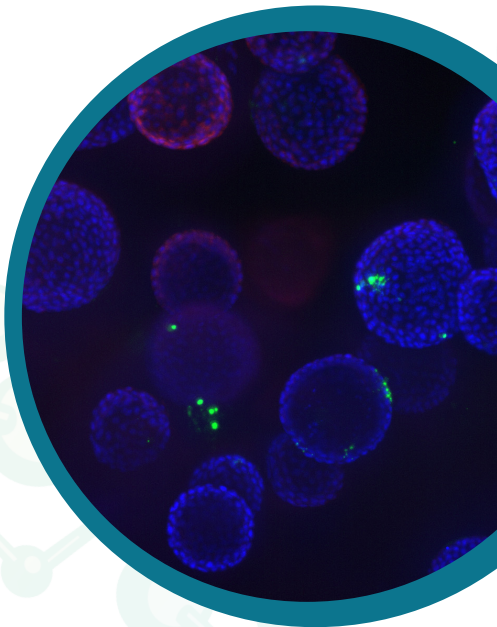
Supports subcellular through whole organism assays

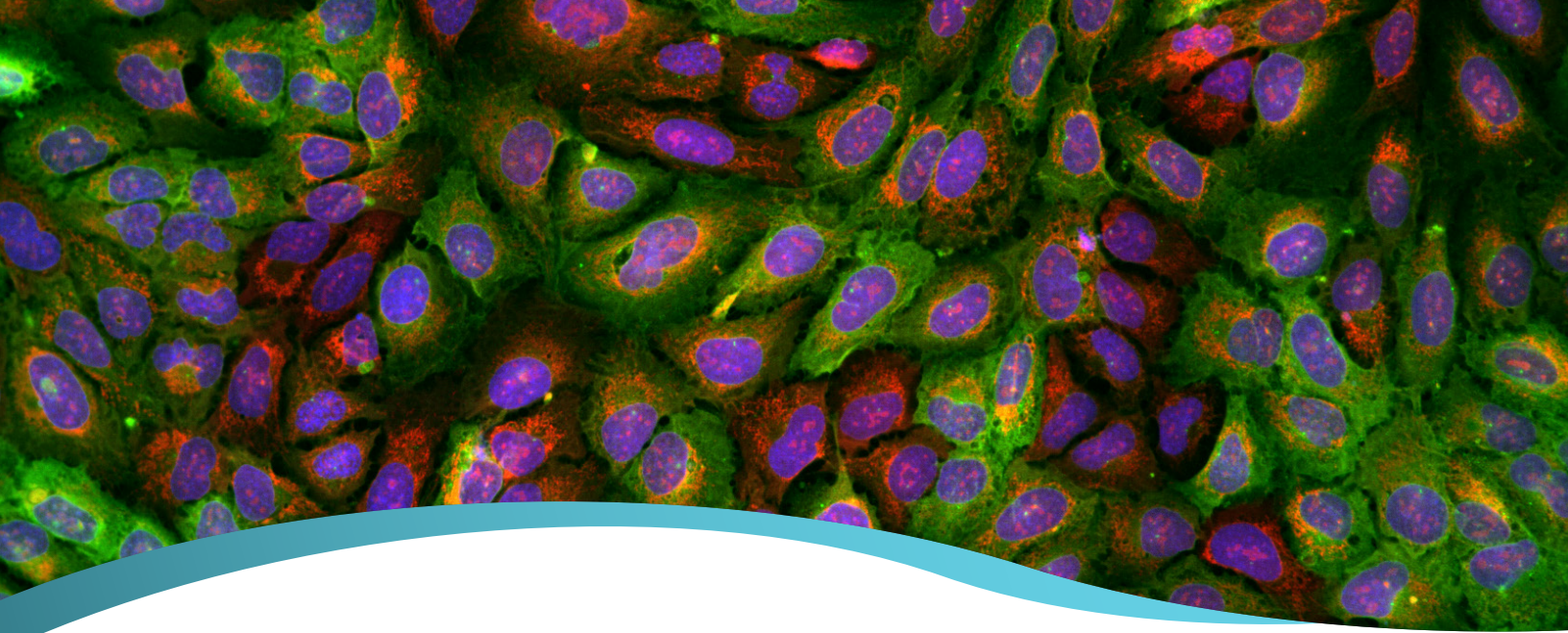
- Widest selection (> 25) of objectives
- Oil objectives with up to 1.4 NA
- Air objectives with up to 0.95 NA
- Water objectives with up to 1.2 NA

Select a spinning disk confocal geometry matched to specific assay requirements.

Spinning disk geometry	60 µm pinhole (single disk)	60 µm disk and 50 µm slit disk (dual disk)	60 µm disk and 42 µm pinhole disk (dual disk)
High-sensitivity detection	•	•	•
Fast acquisition	•	•	•
>3 log dynamic range*	•	•	•
Widefield mode for flat biology	•	•	•
Most confocal applications	•	•	•
Highest resolution imaging			•
High-throughput applications		•	

*Powered by our highly responsive sCMOS sensor.





Features



High-intensity laser light source

High-performance laser excitation with seven laser lines and eight filter combinations increase multiplexing flexibility.



Large field of view

Large field of view enables whole-well imaging and eliminates missed targets. New dual micro-lens spinning disk confocal technology with enhanced field uniformity provides a large, flat field of view for more accurate and reproducible analysis



IN Carta Image Analysis Software

Leverages Modern Machine Learning to improve the accuracy and robustness of high-content image analysis, delivering data insights that other technologies miss. Reduces the complexity of image analysis with intuitive guided workflows in a modern user interface.



Automated water immersion objective technology

Offers greater image resolution and sensitivity with up to 4x increase in signal leading to lower exposure times.



Accurate 3D measurements

MetaXpress® 3D analysis module is optimized for confocal imaging, enabling 3D measurements of volume and distance.



Exclusive AgileOptix spinning disk technology

Provides increased sensitivity with specially designed optics, high-powered laser excitation, and sCMOS sensor. Swappable disk geometries provide flexibility between speed and resolution.



Multiple imaging modes

The system offers phase contrast and brightfield label-free imaging, fluorescence, widefield, and confocal imaging with water immersion optics as a standard option.



Wide dynamic range

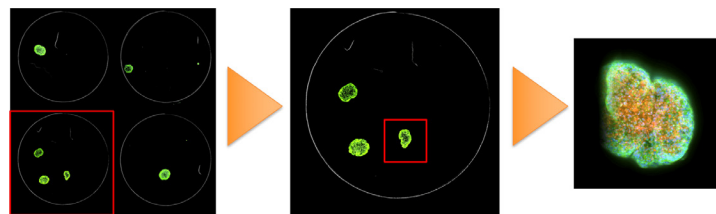
Quantifies low and high intensity signals in a single image with >3 log dynamic range intensity detection.

Discover More with flexibility

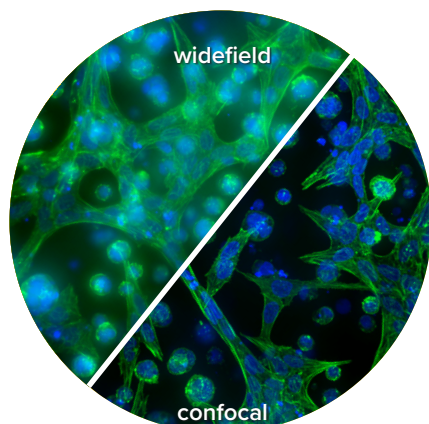
More relevant results with 3D assay models into complex biology

QuickID targeted acquisition

QuickID does the sorting by targeting objects of interest or rare events at low magnification, then automatically imaging them in high magnification. It has the flexibility to acquire images in all types of formats and sizes, and it can scale alongside evolving research needs.



QuickID was used to streamline spheroid image acquisition. An image acquired at low magnification to view the entire well in one field-of-view was used to identify objects for automatic re-imaging at higher magnification using three wavelengths across multiple Z planes.



Cell stained for nuclei and actin growing in a 3D gel. Projection image of seven planes acquired with a 40X Plan Apo objective.

Complex, 3D cellular models yield more predictive, physiologically relevant results versus monocultures or other 2D cellular models. Explore the complexities of these models faster and gain better results even in samples grown in a thick extracellular matrices using the ImageXpress Confocal HT.ai system. It offers flexible options to meet specific research needs and ensures the best images for assays. Get more insight into 3D cells with options like water immersion. Water Immersion objectives can improve signal up to four times while decreasing aberrations when imaging deep into samples providing better image and data quality.

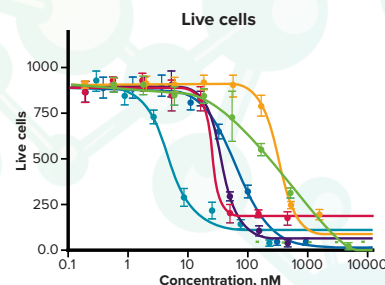
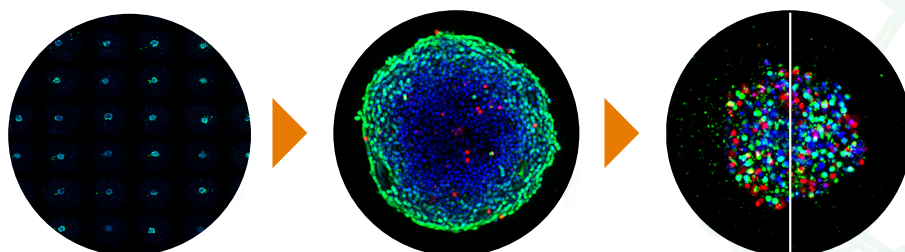
Clearer images and improved quantitative screening for:

- Spheroids
- Thick tissue samples
- Organoids
- Cell painting
- Zebrafish and *C. elegans*
- Homogenous no-wash assays



Turnkey, high-throughput long term kinetics

Quickly and easily scale up 3D drug discovery with the ImageXpress Confocal HT.ai system. It can be used to accurately monitor organoid growth and cell kinetics using transmitted light and a variety of fluorescent cell markers. Environmental control of humidity, CO₂ levels, and temperature keep cells thriving for timelapse experiments running from minutes to several days.



Spheroids in round bottom plates. Dose-dependent effects of selected compounds. Image montage of the 384 plate. Entire spheroid is captured with one image, example segmentation of spheroid, and 4-parametric curve fits for the number of live cells in spheroids.

Discover More with efficiency

Complete solution for screening highly complex biological questions with seamless workflows

Enjoy the benefits of a streamlined high-content screening (HCS) workflow in a fully integrated environment with our complete imaging solution for highly complex biological questions.

Acquire

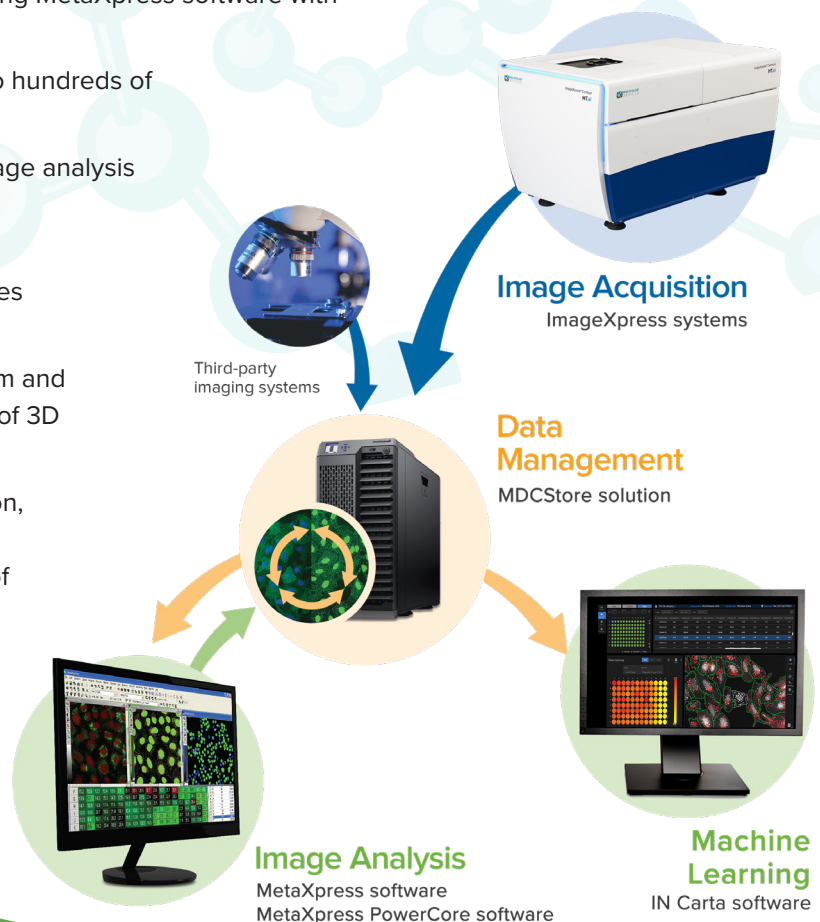
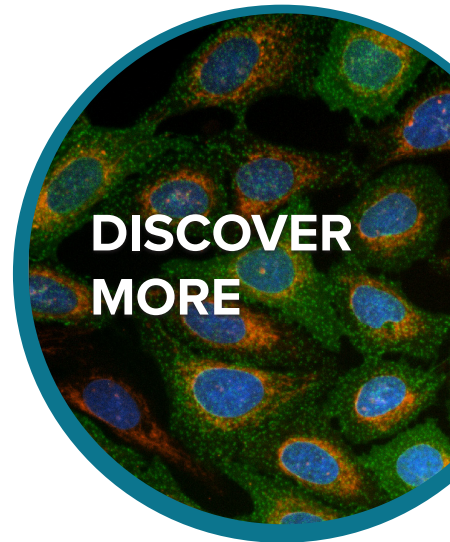
MetaXpress® High-Content Image Acquisition and Analysis Software powers the ImageXpress Confocal HT.ai system, providing precise control over image acquisition and analysis, all within a unified interface.

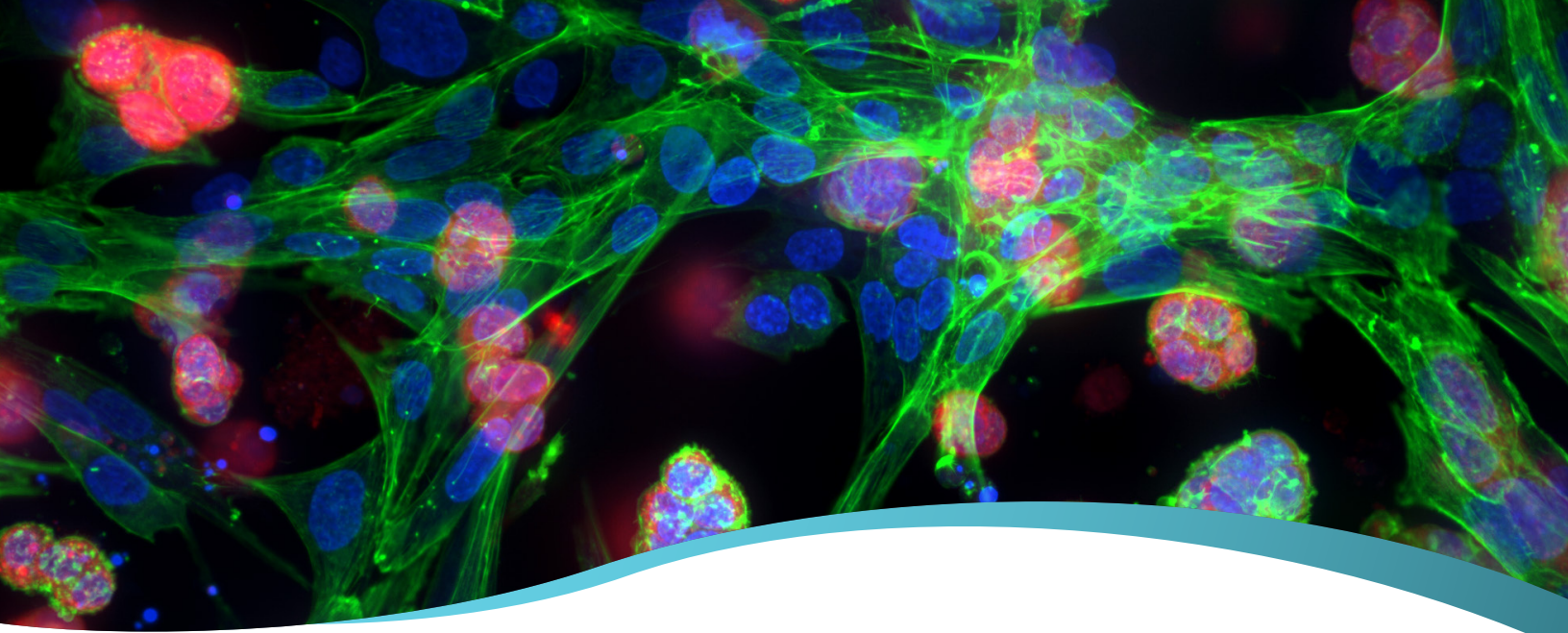
- Laser-based and software configurable image-based auto-focusing system ensures robust focus across a range of sample types
- Acquisition of live cell images enables monitoring of cell growth, death, differentiation, and migration; viral or bacterial invasion, cancer metastasis, chemotaxis, drug toxicity, or translocation

Analyze

Avoid delays in image analysis and data processing using MetaXpress software with application modules for quick and easy data analysis.

- Plug-and-play application modules can be adapted to hundreds of image-based analysis workflows
- Custom module editor enables further tailoring of image analysis routines for a perfect fit
- Adaptive Background Correction™ adjusts image segmentation to the local intensity ranges and features within and between cells for better quantitation
- 2D projection algorithms include best focus, maximum and minimum, and sum projection for easy interpretation of 3D image data
- 3D volumetric analysis evaluates volume, XYZ location, distance to neighboring objects, diameter, depth, various intensity measurements, texture, or number of objects
- Save as cell-by-cell and/or image-by-image data





Discover More with simplicity

Powerful analytics combined with an intuitive user interface and machine learning capabilities simplify workflows for advanced phenotypic classification and 3D image analysis

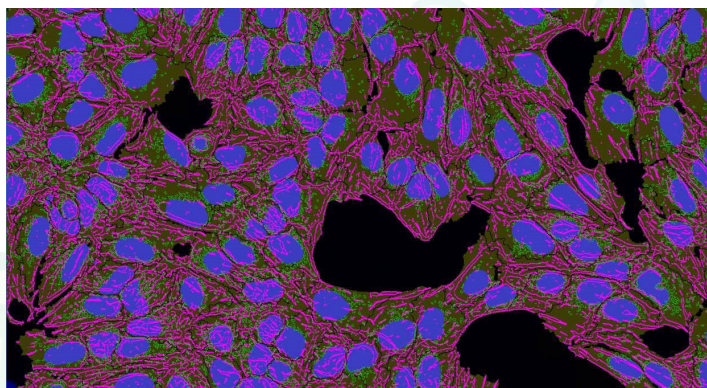
IN Carta Image Analysis Software

IN Carta software makes it simple to embrace the complexity in an image. Deriving insights from 2D, 3D, and time-lapse data, it is streamlined by combining powerful analytics with a modern user interface. Machine learning technology and guided workflows create an optimal user experience where advanced phenotypic analysis is intuitive and the results are reliable. There is no need for image analysis expertise or tedious tweaking and testing of experimental parameters. IN Carta software does the heavy lifting so scientists can focus on their research.

- Guided workflows and scalable batch processing increase productivity. No time is wasted with setting up the analysis.
- Optimized computation quickly delivers unbiased results with helpful visualizations
- Machine learning leverages more information and reduces error in the analysis of high-content screening data to enable new discoveries with confidence.
- Intuitive user experience and cutting edge technology minimizes the software learning curve and removes barriers to productivity.



Scatter plot data display within IN Carta software shows the distribution of nuclei area (x-axis) and nuclei diameter (y-axis).



Segmentation mask represents the nuclei (blue), endoplasmic reticulum (green outlines), and actin filaments (magenta).

Specifications

System

- High-speed laser autofocus with integrated image autofocus option
- Linear encoded voice coil driven X, Y, and Z stages with better than 25 nm resolution
- 4-position automated objective changer*
- 5-position software selectable dichroic filter wheel*
- 8-position software selectable emission filter wheel*
- Sample compatibility: slides and one to 1536-well microplates, round or flat bottom, low to high profile

*User changeable

AgileOptix optical path

- AgileOptix technology enables the ImageXpress Confocal HT.ai system to deliver the sensitivity and throughput needed for demanding applications by combining a powerful laser light source, high-quantum efficiency 16-bit, >4 megapixel scientific CMOS sensor, and selectable confocal geometries
- Large field of view (1.96 mm² at 10X) imaging maximizes collection of publication-quality images and statistically relevant data
- >3 log dynamic range is available in both widefield and confocal modes
- Confocal can be purchased in one of the following three configurations:
 - Single-disk configuration with 60 µm confocal pinhole and widefield modes
 - High-throughput dual disk configuration with 60 µm confocal pinhole, unique and exclusive 50 µm slit confocal and widefield modes
 - High-resolution dual disk configuration with 60 µm and 42 µm confocal pinholes and widefield modes
- High-intensity seven channel laser illumination from 405 nm to 750 nm

Option	Feature
Water Immersion Objectives	<ul style="list-style-type: none">• 20X, 40X, and 60X (up to 1.2 NA)• Increase signal up to 4X for brighter intensity at lower exposure times• Increase in penetration depths dependent on sample• Improve Z-resolution and decrease optical aberrations• Auto water replenishment enables screening or imaging across a plate
Environmental Control	<ul style="list-style-type: none">• Multi-day, live cell time-lapse imaging• Provides appropriate atmospheric conditions (e.g. 5% or 10% CO₂)• Mimics physiological environment (30–40 °C ± 0.5 °C)• Controls humidity and minimizes evaporation (0.5 µL/well/hour for 96- or 384-well formats)
Phase Contrast	<ul style="list-style-type: none">• High contrast imaging where unstained cells are easily viewed or separated from background (4X–60X)• Ideal for non-fluorescent histochemically stained samples• Nikon 100W Pillar Diascopic Illuminator with TE-C ELWD Condenser• 0.3 NA with 65 mm WD and PhL, Ph1, and Ph2 selectable phase rings• Fluorophore-independent morphology visualization with fluorescent imaging overlay

Note: all options, filters, and objectives are available at point of sale or as after market upgrades. Configurations shown herein do not encompass all configurations available. Contact your sales and support team today to identify the system configuration most suitable for your applications.

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