APPLIED SPECTRAL IMAGING

DIGITAL CYTOGENETICS

EVERY DIAGNOSIS **COUNTS**

Company Overview

Applied Spectral Imaging (ASI) is a Global Leader in Digital Cytogenetics and Pathology

Founded in 1993, ASI has established a global presence across more than 80 countries. With over **5000 systems installed worldwide**, the Company provides a comprehensive product portfolio in the field of biomedical imaging.

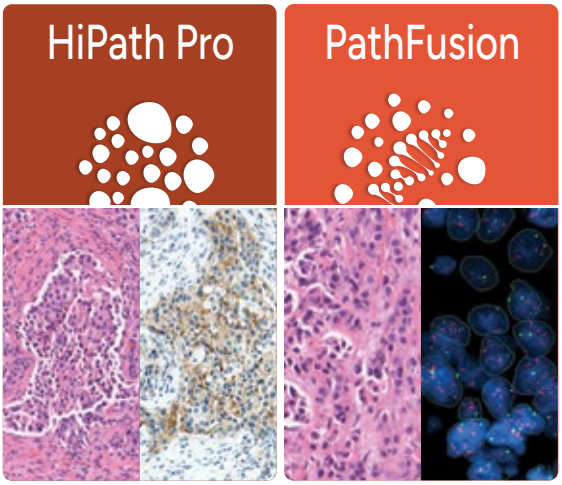
ASI's technology, powered by GenASIs, offers a broad range of solutions for brightfield, fluorescence and spectral imaging. Its multiple applications address diagnostic needs across several domains, including **karyotyping, FISH, digital pathology** and a combined **"All-in-One"** solution.

The Company's extensive portfolio of **FDA-cleared products** include BandView, FISHView, SpotScan for CEP XY, UroVysion, ALK, and HER2/neu FISH, as well as the HiPath immunohistochemistry (IHC) Family for HER2, ER, PR, and Ki67 in manual configuration. The ASI product family is **IVDR compliant**.

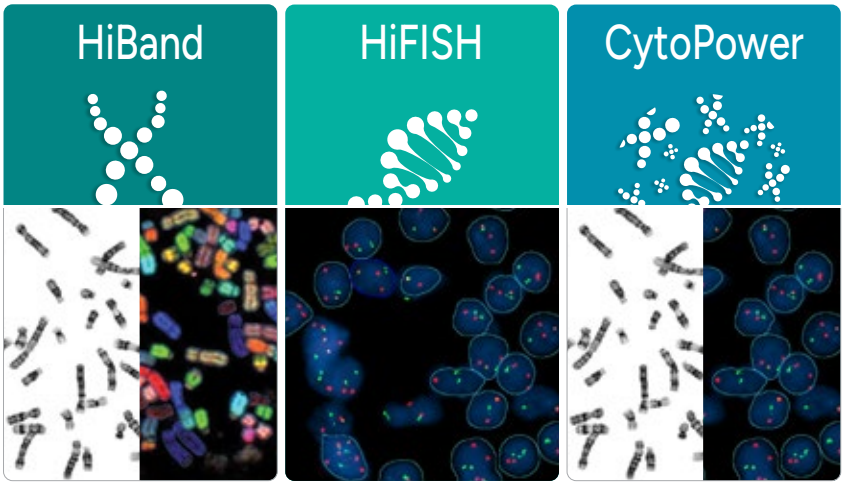
With offices in the USA and Asia, as well as a vast network of global distribution partners, ASI is dedicated to advancing diagnostic capabilities worldwide, because **every diagnosis counts**.

Product Portfolio

ASI PATHOLOGY



ASI CYTOGENETICS

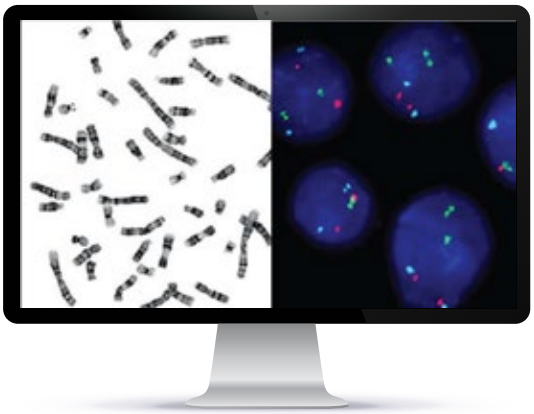


Comprehensive Digital Karyotyping & FISH Solution

Automated Workflows with ASI's Digital Cytogenetics Platform

ASI's cytogenetics platform is a **versatile** imaging and analysis solution offering chromosome review and computer-aided karyotyping **(HiBand)**, automated FISH analysis **(HiFISH)** or a combination of both **(CytoPower)**. The platform also features **HiSKY**, ASI's renowned gold standard for spectral karyotyping (multi-color FISH analysis).

Supporting both **single and multiple readers**' workflows, the platform provides standardized and consistent results across multiple sample types, staining techniques, and vendor-agnostic probes. Adjustable to address laboratories' needs, the platform offers a range of **image acquisition solutions**, from 1-slide manual capture to 9-slide scanner and 99+ slide tray loader.



Benefits to your lab

- **Versatile** platform **customizable** to your needs
- Real time statistical results and **quantitative analysis**
- Secured database and **case data management**
- Connectivity with **Lab Information Systems**
- **HIPAA-compliant** remote access solution

HiBand

HiBand offers a digital solution for cytogenetic laboratories, combining **automatic high throughput scanning** with **computer-aided chromosome analysis and karyotyping**. Supporting metaphase review and approval while scanning, HiBand provides advanced functional tools for image analysis across a variety of banding patterns including **G-Band**, **Q-Band** and **R-Band**.

Computer-Aided Karyotyping

ASI's automated karyotyping workflow performs chromosome detection, segmentation and classification requiring **minimal human intervention**. Integrated into HiBand, **computer-aided karyotyping** is applicable to all sample types, and can be used on both manual and scanning platforms. Karyotyped metaphases, which can optionally be sorted automatically according to their quality, are available for review and approval **while scanning**.

Scanner-Agnostic Karyotyping

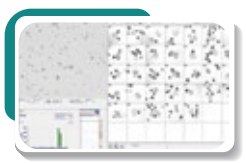
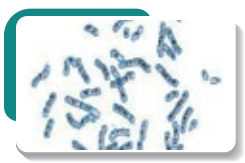
With HiBand, computer-aided chromosome analysis and karyotyping is also available **on images acquired on third-party scanners***.

* Please ask your ASI representative for more details.

Benefits to your lab

- Automatic **Metaphase Finder** to identify best cells for analysis
- **Magic Tool** for easy chromosome separation and boundary editing
- **Image Gallery** displaying all metaphases and karyotypes
- **Chromosome Compare** to review cells and chromosomes side-by-side
- **Aberrant Ideogram** for detailed chromosome analysis

Digital Karyotyping: Boosting Lab Productivity

Metaphase Search & Mitotic Index Calculation at 10X	Metaphase Scanning & Cell Type Detection at 100X	Optional Sorting by Karyotype Quality	Computer-Aided Chromosome Segmentation	Computer-Aided Chromosome Classification*
				
			Correctly segmented **93**% BL | **90**% BM	Correctly classified **99**% BL | **96**% BM

* Following manual adjustments to correct automatic segmentation

Karyotype

Computer-aided karyotyping, with automatic ISCN, band estimation and overlap score

Count

Automatic chromosome counting

Analyze

Automatic chromosome indexing and classification

Easy Separation & Boundary Editing

ASI's **"Magic Tool"** combines 12 operations in a simple mouse click

Saves hundreds of mouse-clicks per karyotype!

Overlap

Split

Extend

Combine

"The ASI Slide Loader and Metaphase Finder runs overnight and provides a gallery of digital metaphase images ready for analysis, eliminating the time to ascertain analyzable metaphases and reducing the analysis time, ultimately increasing technologist productivity, compared to traditional methods based on microscopy."

Persaud T, Bambach R, Schmidt R, Brenholz P, Journal of the Association of Genetic Technologists

Reference Atlas for Higher Assurance

Internet toolbar with selection of **predefined genetic websites**, provides the expert support needed to investigate, research, and confirm challenging abnormalities.

Advanced Onscreen Supervisor or Director Review

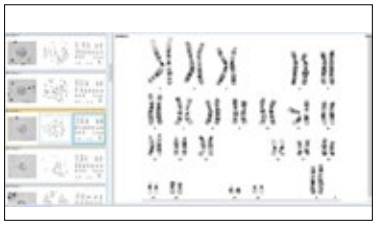
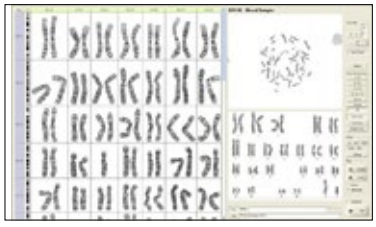


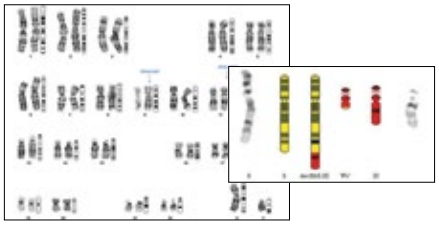
Image Gallery

Display of all case metaphases and karyotypes



Chromosome Compare

Display all captured cells and chromosomes side-by-side

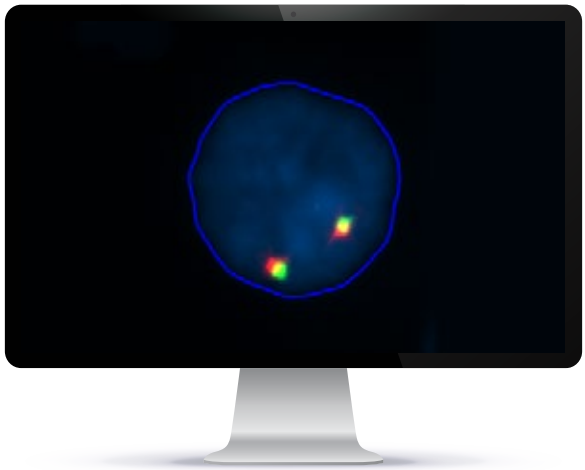


Aberrant Ideogram

Generate chromosomes, cells, ideograms and annotations in an image generator

HiFISH

HiFISH is a cutting-edge **computer-aided digital FISH scanning and analysis** solution offering advanced computational tools and automated workflows. Vendor-agnostic, the system supports **unlimited number of probes** which are optimized based on users' needs. Combining 3D cell review with robust image quality through adaptive image optimization, HiFISH provides standardized results based on automatic signal detection and cell classification. Flexible analysis workflows for single or multiple readers, associated with automated **quantitative FISH analysis**, offer high versatility to address most laboratory needs.

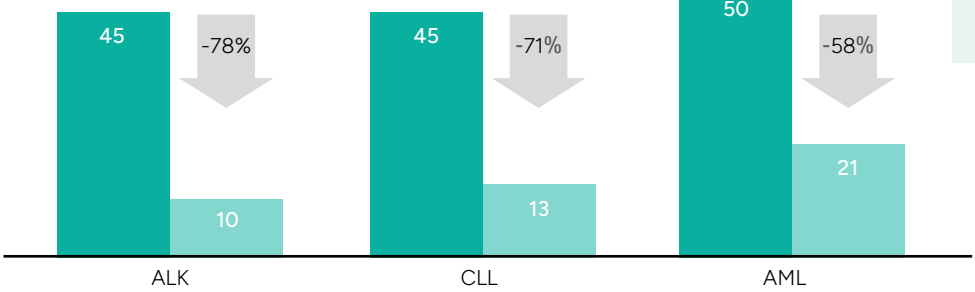


Benefits to your lab

- **FISH scanning** uniquely optimized per hybridization
- Unlimited number of **vendor-agnostic** probes
- High quality image with **digital 3D review** of each cell
- Cell gallery for **fast classification** & review
- Real time **computer-aided analysis**
- Automatic detection of **abnormal patterns**
- Option for multi-reader **double blinded review**
- Simultaneous interphase & metaphase capture for **quality assurance**

Increased Lab Productivity with Automation

Over 55% Time Savings (Minutes / Case)

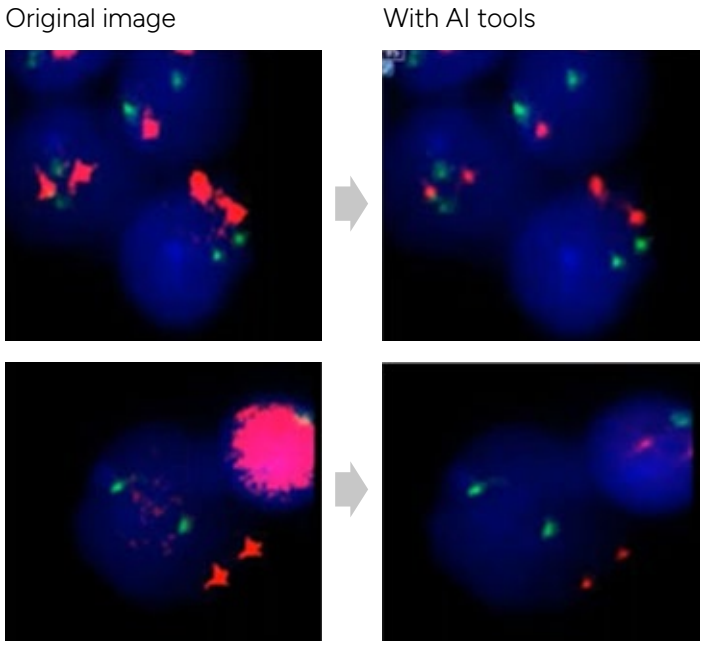


Streamline your workflow with more automated capabilities

Robust Image Quality Using Adaptive Statistical Algorithms

Validated to identify what the human eye may not see for standardized results

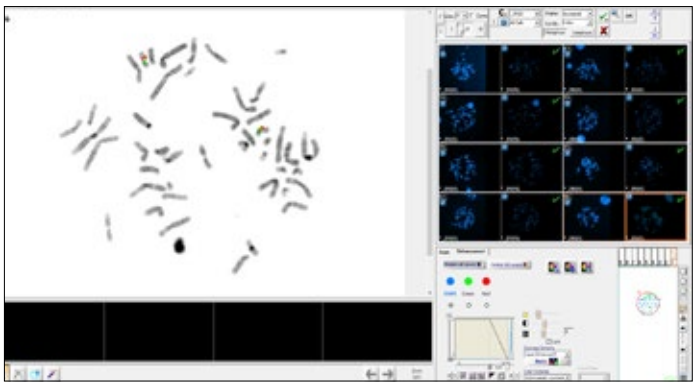
- **Acquisition parameters** optimization
- **Consistent signal** appearance across sample
- **Reduction of external debris** and nuclear noise
- **Eliminates need** for manual parameters manipulation
- Optimized **visualization and classification**

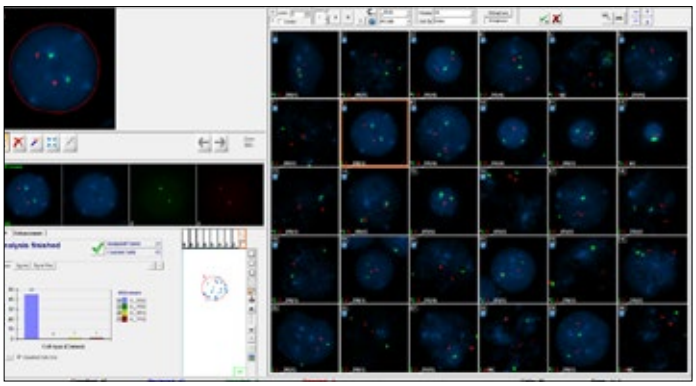


> "HiFISH allows us to view many more cells than we would with a manual microscope, which leads to more accurate and reliable results. Manual FISH analysis is tedious and leads to technologist fatigue but HiFISH never gets tired."
>
> *Dr. Hadid Y, Bnai Zion Medical Center*

QC Application - Simultaneous Interphase & Metaphase Scanning

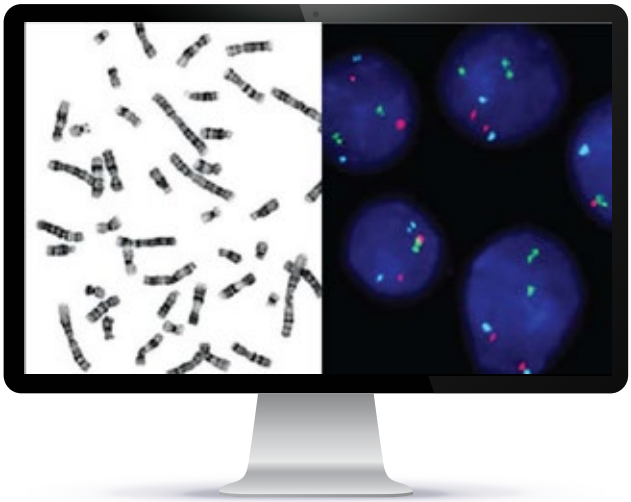
Identify probe signals on chromosomes to confirm FISH analysis accuracy





CytoPower

CytoPower is an end-to-end digital imaging and analysis solution for **both brightfield and fluorescent specimens**, combining **HiBand** for chromosome review and computer-aided karyotyping, and **HiFISH** for automated FISH analysis.



Benefits to your lab

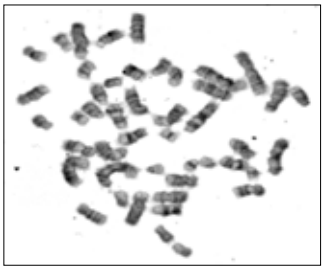
- A **single platform** for karyotyping and FISH
- Clinical applications for **all sample types**
- **Automated workflows** and feature-rich applications
- **Customizable case reports** with images and quantitative results

"CytoPower doubled our lab productivity in bone marrow karyotyping and tripled our productivity in blood sample karyotyping."

Nettie Rietema, University Medical Center Groningen, NL

Clinical Applications for Multiple Sample Types

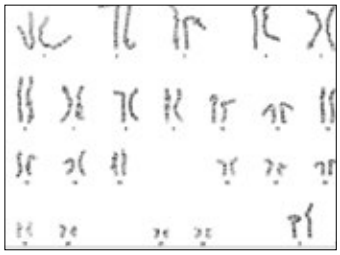
- Bone Marrow
- Peripheral Blood
- Solid Tumors
- FFPE Tissue
- Cytology



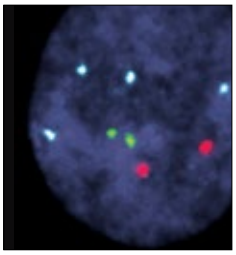
Bone Marrow

Blood

Hematology FISH Workflow



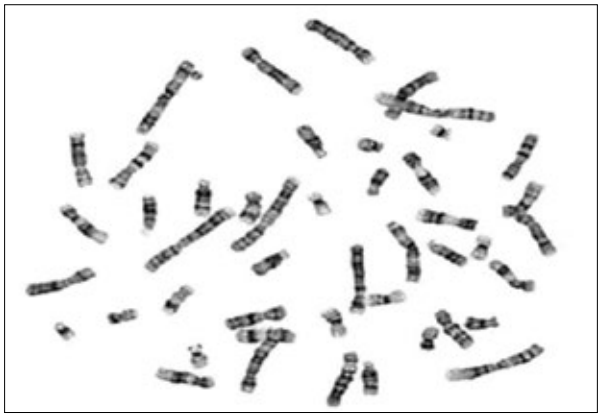
Karyotyping
Brightfield
Microscopy



FISH
Fluorescence
Microscopy

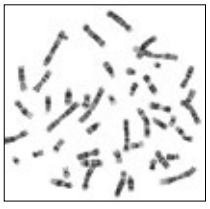
Digital Chromosome Analysis

Efficiency, Precision and Versatility



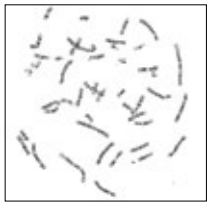
High resolution 5MP camera sensor combined with a high quality 100x immersion oil objective

Broad Staining and Sample Menu



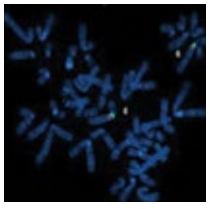
G-Band

Q-Band

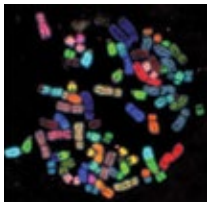


R-Band (BF)

R-Band (FL)



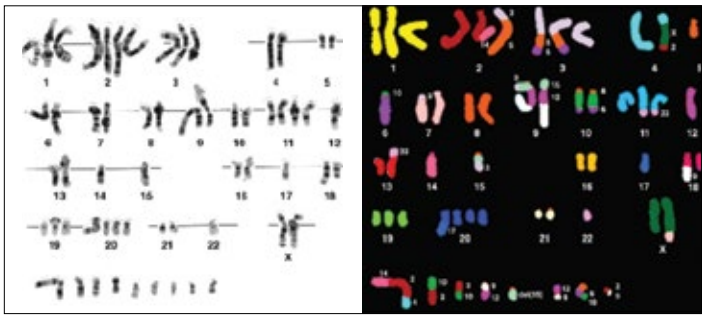
FISH



Spectral

Research Applications

HiSKY* Gold Standard Spectral Karyotyping



Brain Tumor

Ewing Sarcoma

*HiSKY is for research purposes only

Multi-Color FISH Analysis for Result Verification

- Automatic identification of **translocations** and **chromosomal origins**
- Simultaneous detection of **chromosomal aberrations** in one hybridization
- Measurement of **entire spectrum** at each point

HiSKY Probe Kit

Chromosome paints for:

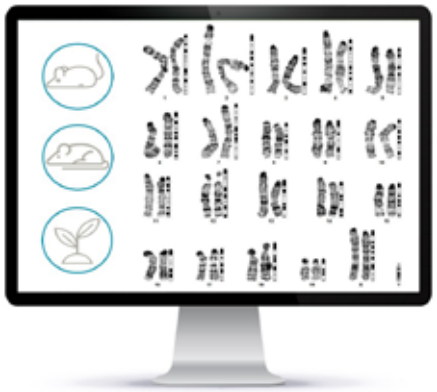
- Human
- Mouse

"Spectral karyotyping provides a valuable diagnostic tool for establishing the origin of supernumerary marker chromosomes or derivative chromosomal material that cannot be identified with standard cytogenetic techniques."

Anguiano A, Wang BT, Wang SR, Boyar FZ, Mahon LW, Naggar MM, Kohn PH, Haddadin MH, Sulcova V, Sbeiti AH, Ayad MS, White BJ, Strom CM, Molecular Cytogenetics

Multispecies Chromosome Analysis and Karyotyping

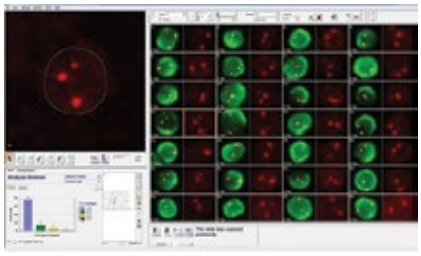
HiBand and HiFISH software support genetic research programs with **multispecies chromosome analysis** and karyotyping for brightfield and FISH specimens, featuring multiple classifiers for both animals and plants.



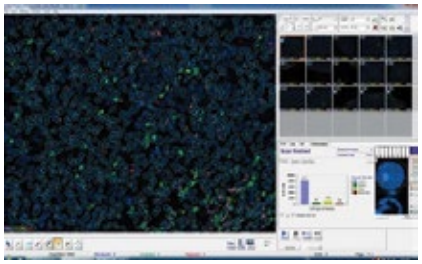
Benefits to your lab

- **Finding all metaphases** and optionally sorting them by quality
- **Automatically capturing** preferred ones without any human interaction
- Possibility to run pathology applications **on same system**

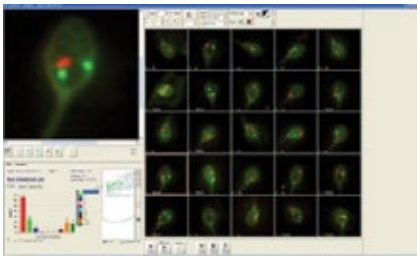
FISH for Research



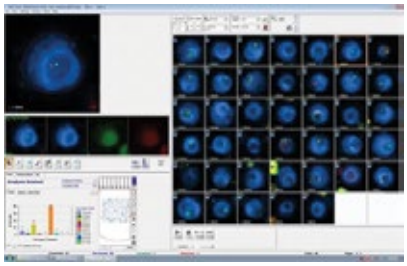
Circulating Tumor Cells



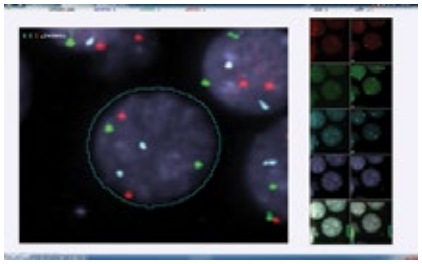
Immuno Fluorescence



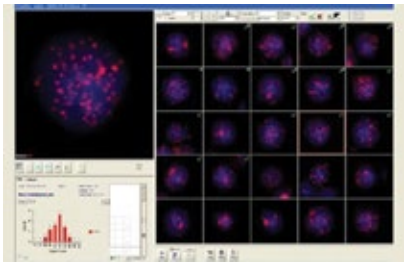
Sperm Cells



clgFISH



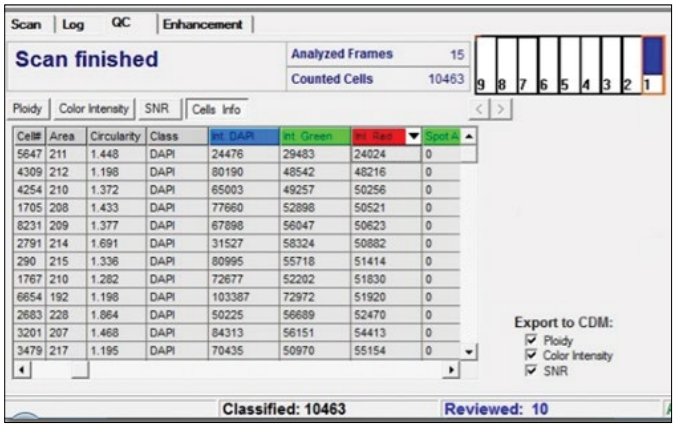
Successive Staining



Telomeres

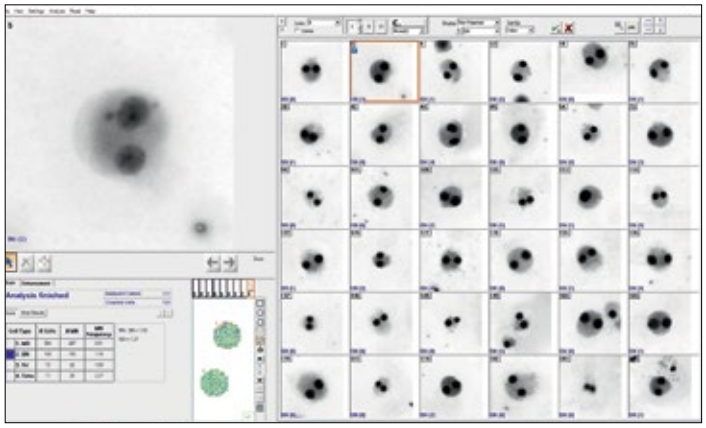
Quality Control of Probe Assays

- **Cell phenotyping** and signal classification
- Measurement and display of multiple cellular and **signal properties**



MN Score

Micronuclei imaging, scoring and analysis for measurement of DNA damage, cytostasis and cytotoxicity.



A Comprehensive Digital Chromosome Analysis and FISH Workflow

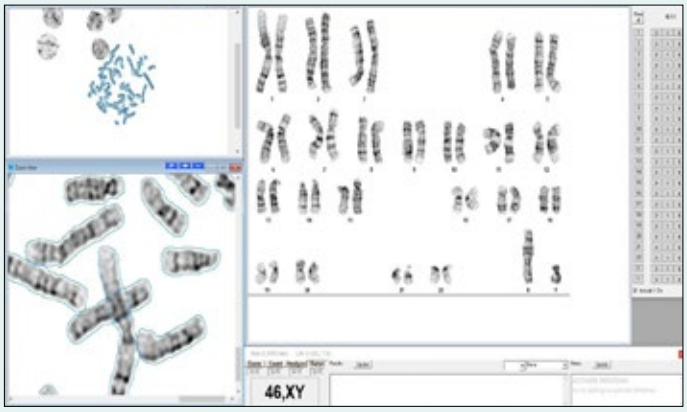
1 Scan & Capture

Digitize your slides.
Capture both metaphase and interphase cells on ASI or other image acquisition system

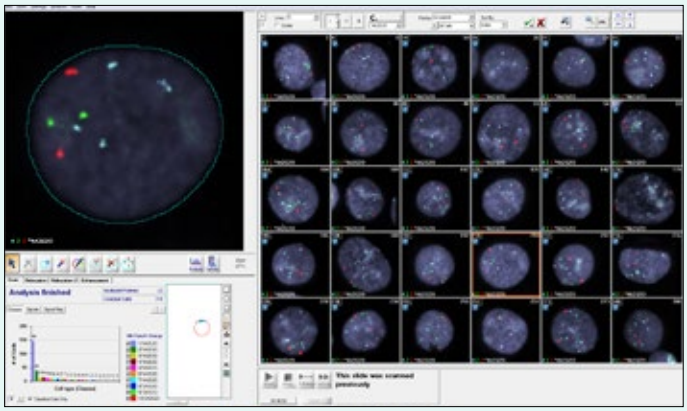
2 View & Analyze

Analyze images using computer-aided karyotyping* and automated FISH classification

HiBand



HiFISH



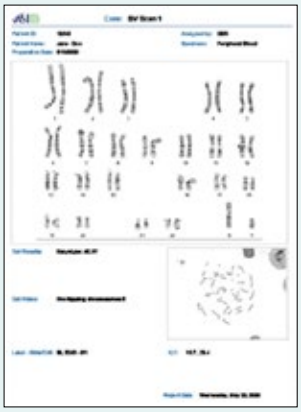
* Computer-aided chromosome analysis and karyotyping is also available on images acquired on third-party scanners. Ask your ASI representative for more details.

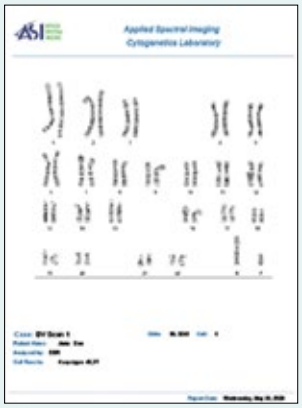
3 Review & Sign-Off

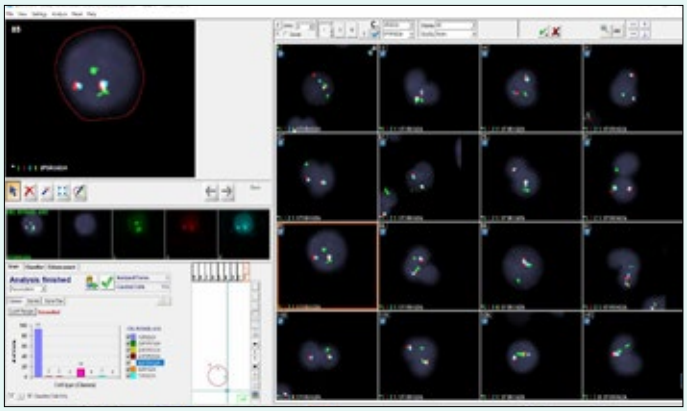
Review and approve karyogram and statistical results of FISH signals

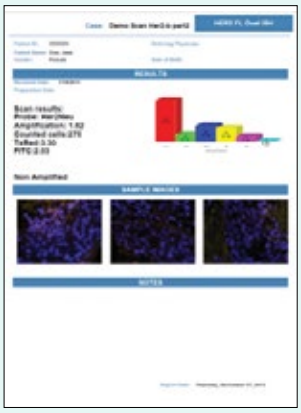
4 Report

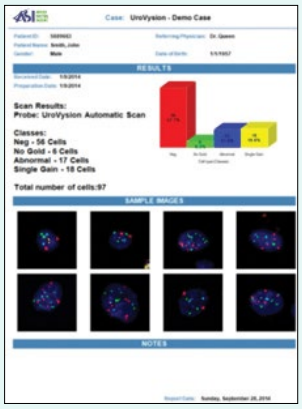
Submit comprehensive case details including screenshots, images and quantitative results









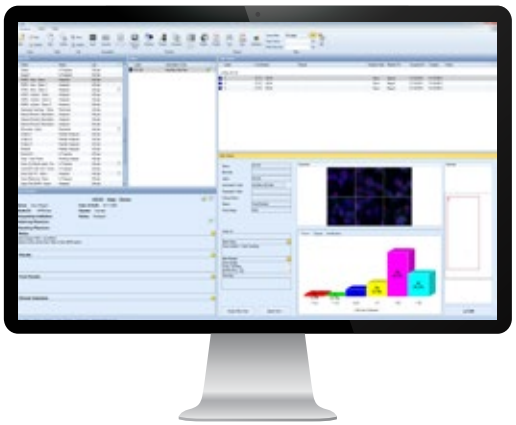


Case Data Manager and LIS Connectivity

With its **Case Data Manager (CDM)** application, ASI offers a unique and comprehensive solution that can help streamline the data management process and provide a more **efficient and secure system** for the cytogenetic laboratory. By integrating with the **Lab Information System (LIS)**, ASI's platform can help manage data more effectively, saving time and resources.

Benefits to your lab

- **Paperless** workflow
- **Secure** data management
- Central portal and **database**
- Secure integration with **LIS**
- Supports **HL7/FHIR**, **XML**, **ShireText** and more
- Data integrity & **HIPAA compliance**



GenASIs AnyWhere

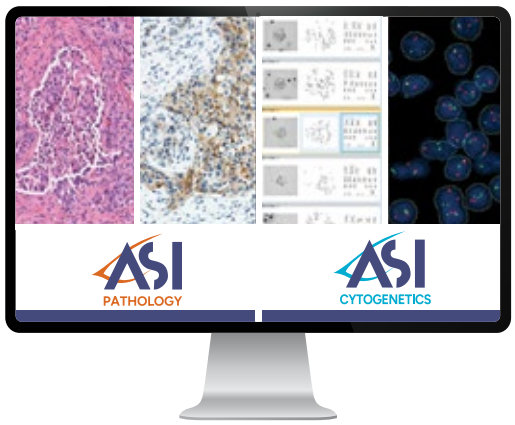
ASI's **advanced virtual access** solution enables HIPAA-compliant access to your lab's GenASIs platform from any location. This secure and trouble-free solution makes remote data management easy, ensuring that you can **access your lab's data anytime, anywhere.**

Benefits to your lab

- Optimal for **remote consultation**, educational and training needs
- Uncompromised **data security**
- Efficient management and maintenance of **multiple systems, and users**
- Compatible with Microsoft Remote Desktop Services (**RDS**) **Citrix**, VMware **Horizon**

All-in-One Solution

Combining digital pathology, karyotyping and FISH, ASI's **All-in-One** solution offers a **comprehensive workflow** from scanning to image viewing, quantitative analysis and reporting for both brightfield and fluorescent images. All-in-One provides a modular and versatile solution addressing the needs of both **cytogenetics** and **pathology** laboratories in one single platform.

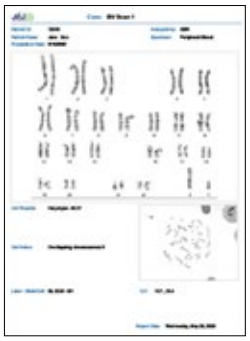


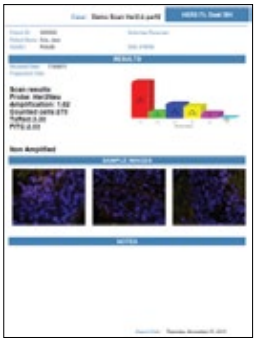
Advanced Reporting

ASI's reporting tool provides a user-friendly interface to create laboratory-branded **customizable reports** according to the user's needs.

Benefits to your lab

- **Dedicated report** for each application
- **Quantitative** and **graphical** results
- User-selected **screenshots** and **images**
- **Freehand report** using multiple annotation styles





LabLife Statistics

Benchmarks
Calculate performance and track KPIs to help meet certification and regulatory requirements

Optimization
Identify best practices to increase return of investment and focus improvement efforts

Growth
Justify investment in additional capital equipment to improve lab efficiency

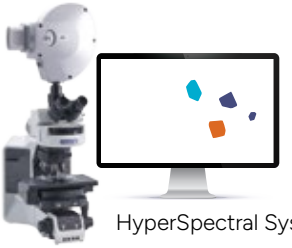
Annual Review
Compare performance year on year and make decisions based on data driven analyses

Diverse Image Acquisition Platforms

1-Slide Capture System

9-Slide Scanning System

99+ Slide Tray Loader



HyperSpectral System

Review & Analysis Station

AnyWhere Remote Connectivity

Adapted Service Offering

The ASI team is committed to supporting your laboratory by providing expert and superior service throughout the year. Different **Service Packages** are available to provide the highest level of service according to your specific needs.

System Specifications

Manual 1 Slide

9 Slide Motorized Stage

99+ Slide Tray Loader

HyperSpectral 1 Slide

		HiBand	HiFISH	HiBand	HiFISH	HiBand	HiFISH	CytoPower
Microscope Support		BF upright microscopes	FL upright microscopes	OLYMPUS BX63* BF ZEISS AxioImager Z2 BF		OLYMPUS BX63* BF ZEISS AxioImager Z2 BF		BF & FL upright microscopes
Objectives	OLYMPUS	10x/0.3NA 100x/1.3NA	10x/0.3NA 60x/1.25NA	1.25x/0.04NA** 10x/0.3NA 100x/1.3NA	10x/0.3NA 60x/1.42NA	1.25x/0.04NA** 10x/0.3NA 100x/1.3NA	10x/0.3NA 60x/1.42NA	10x/0.3NA 63x/1.44NA 100x/1.3NA
	ZEISS		10x/0.3NA 63x/1.44NA		5x/0.16NA 10x/0.3NA 40x**/1.3NA 63x/1.44NA		5x/0.16NA 10x/0.3NA 40x**/1.3NA 63x/1.44NA	
Camera		5MP CMOS Monochrome		5MP CMOS Monochrome		5MP CMOS Monochrome		Spectral 1.3MP Monochrome
Slide Capacity		1 Slide		9 Slides		99 Slides		1 Slide
Barcode Reader		Handheld 1D/2D		Handheld 1D/2D		Integrated 1D/2D		Handheld 1D/2D
Automated Oil Dispenser		N/A		Optional		Integrated		N/A
Dimensions (WxDxH)		According to installed microscope		61cm x 69cm x 85cm (24"x27.2"x33.5")		100cm x 90cm x 90cm (39.4"x35.5"x35.5")		According to installed microscope
Weight		According to installed microscope		45kg | 99.2lb		80kg | 176.4lb		According to installed microscope

* Although, the Olympus BX61 is no longer available to purchase and is obsolete, ASI will still support this model.

** Optional

North America
Applied Spectral Imaging Inc.
Tel: +1 760 929 2840
sales-inc@spectral-imaging.com

Headquarters
Applied Spectral Imaging Ltd.
sales@spectral-imaging.com

www.spectral-imaging.com

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ASI CYTOGENETICS