# AKOYA
## BIOSCIENCES®
THE SPATIAL BIOLOGY COMPANY®

# PHENOIMAGER HT 2.0
## The Fastest Spatial Signature Solution

# SPATIAL SIGNATURES: A NEW STANDARD FOR PREDICTIVE VALUE

## What are Spatial Signatures?

Spatial Signatures are predictive biomarkers based on spatial relationships and protein co-expression of specific cellular subsets assessed within the context of the tumor micro-environment (TME). These spatially determined predictive biomarkers measured by multiplex immunofluorescence provide deeper insights into tumor-immune biology and could inform treatment response.
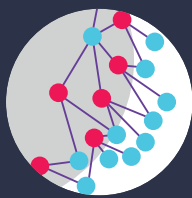
**VISUALIZE** → **QUANTIFY** → **PREDICT**

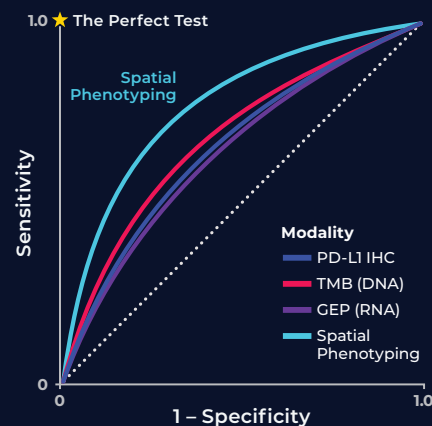**These unique predictive biomarkers can be based on the following within the TME:** presence or absence of a phenotype, proximity, density, structures or unique neighborhood or a combination of these features.

## Spatial Signatures Outperform Other Biomarker Modalities in Predicting Immunotherapy Response

A large-scale meta-analysis of data from more than 50 studies, 10 types of cancer and outcome data from more than 8,000 patients, published in JAMA Oncology[1] showed that spatial phenotyping measured by multiplex immunofluorescence (mIF) more accurately predicts patient response to anti-PD-1/PD-L1 therapy than other biomarker assays, including PD-L1 IHC, tumor mutational burden (TMB), and gene expression profiling (GEP).

★ The Perfect Test

Spatial Phenotyping

Sensitivity

**Modality**
— PD-L1 IHC
— TMB (DNA)
— GEP (RNA)
— Spatial Phenotyping

1 – Specificity

1. Lu S, et. al., JAMA Oncol. 2019, 5(8):1195-1204

# EXPERIENCE THE FASTEST SOLUTION FOR SPATIAL SIGNATURES

## Why choose the PhenoImager® HT 2.0?

As the premier and most highly cited imager for spatial phenotyping and spatial signature development, the PhenoImager HT 2.0 is the fastest whole-slide multispectral imaging system that can be easily integrated into high-throughput workflows to accommodate for scalability.
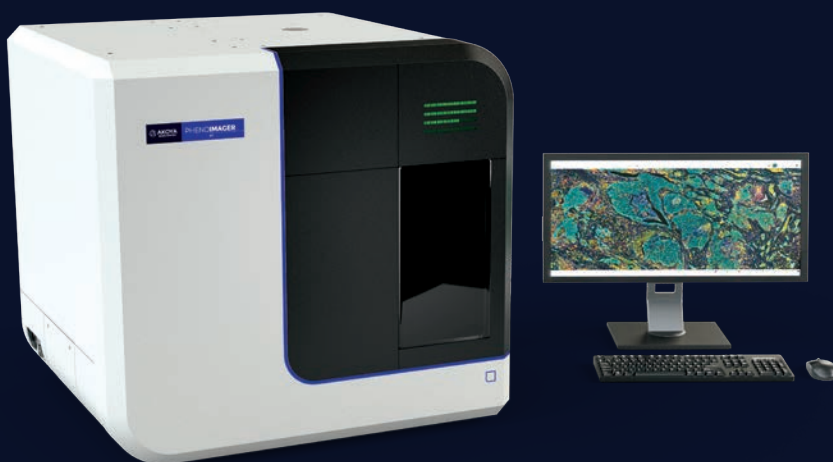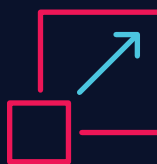


### SPEED

The fastest imager for spatial phenotyping and signature development
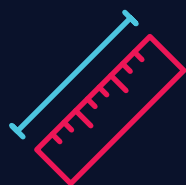
### ACCURACY

Onboard spectral unmixing enables quantitative and accurate phenotyping

### HIGH THROUGHPUT

Image 400+ multiplex stained slides per week to fit any project of your scale

### PROVEN

350+ instrument installations; 1000+ cited publications

# PHENOIMAGER HT 2.0

## A Unique Technology Stack Designed to Provide Best-in-Class Performance

Spatial Biology 2.0 is about developing spatial signatures at scale. To accomplish this PhenoImager HT 2.0 equips researchers with a unique technology stack combining onboard spectral unmixing, rapid imaging and manageable data outputs, delivering unparalleled performance for spatial signature development.



Fastest Multispectral Imaging Technology

Onboard Spectral Unmixing

Manageable Gigabyte Sized 16-bit QPTIFF files
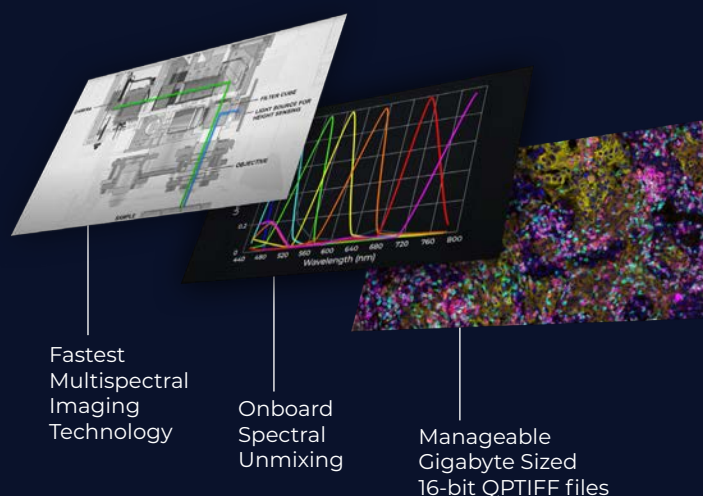
## The Fastest End-to-End Solution for Spatial Signature Development

The discovery and validation of Spatial Phenotypic Signatures requires a solution that easily integrates staining, imaging, and analysis using existing workflows while providing speed, accuracy and reproducibility.



**STAIN**

Whole-slide staining of tissues using pre-designed or custom antibody panels.
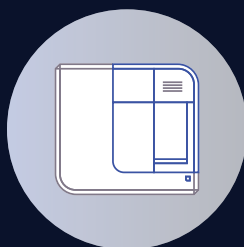
**IMAGE**

Rapid whole-slide image acquisition with onboard spectral unmixing and touchless walkaway automation.

**ANALYZE**

Visualize and interpret using Akoya's software suite or open-source solution.
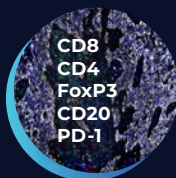
# SCALE MEETS FLEXIBILITY

## PhenoCode Signature Panels

**CD8
CD68
PD-L1
FoxP3
PanCK**

Immuno-Contexture

**CD8
CD68
CD3
CD20
PanCK**

Immune Profile

PhenoCode Signature Panels streamline staining workflows, reducing assay development time by 3X. They allow for easy integration of one additional marker to a 5-plex base panel for added flexibility in cell phenotyping analysis or to address a specific research question with your own preferred marker of choice.

**CD8
CD3
Ki67
GrzB
PanCK**

Activated TIL Status

**+**   **1 CUSTOM MARKER**

**CD8
CD4
FoxP3
CD20
PD-1**

T Cell Status

**PHENOCODE
SIGNATURE
5-PLEX BASE
PANELS**

DOWNLOAD WHITE PAPER AT
**akoyabio.com/6-plex-success**

# SENSITIVITY & VERSATILITY

## Opal TSA Chemistry

Akoya's Opal® Tyramide Signal Amplification (TSA) chemistry is the ideal choice for multiplex immunofluorescence with maximum flexibility. It offers the capability to identify low-abundance proteins with a sensitivity 10 to 100 times greater than chromogenic IHC, and an expanded dynamic range for the simultaneous detection of up to 8 markers.

**High
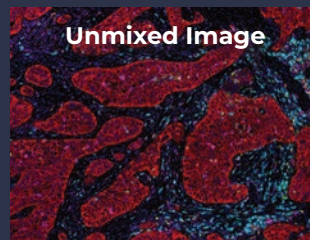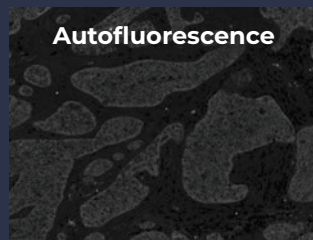Sensitivity
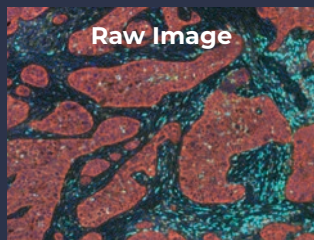Detection
Kits**

**Staining
Reagents**
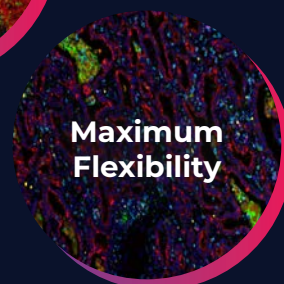
**Maximum
Flexibility**

# PHENOIMAGER HT 2.0: ACCURATE DATA FASTER

## Data Accuracy with Higher Plexing

Accurate multiplex immunofluorescence analysis is often complicated with issues such as tissue autofluorescence and spectral overlap.



**Raw Image**

**Autofluorescence**

**Unmixed Image**

Lung Cancer stained with a 6-plex Panel:

| | |
|---|---|
| **DAPI** | **PD-1** |
| **CD8** | **panCK** |
| **PD-L1** | **CD68** |
| **FoxP3** | |

Akoya's patented multispectral imaging (MSI) and spectral unmixing technology applied to stained fluorescent images can isolate autofluorescence, **increasing accuracy** of phenotyping up to 50%.

## Fast and Easy: One-click Spectral Unmixing



PhenoImager HT 2.0

Parallelized Spectral Unmixing provides a **5X faster** workflow

Slide Imaging

Spectral Unmixing
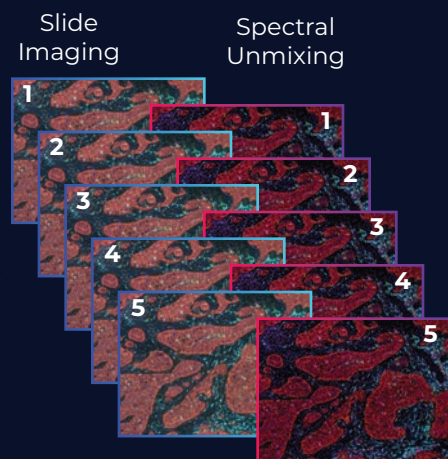
Ready-to-analyze spectrally unmixed 16-bit QPTIFF Images

# FROM IMAGES TO PHENOTYPES TO SIGNATURES

Akoya's QPTIFF file format revolutionizes spatial imaging, rendering it manageable and efficient with Gigabyte-sized files while preserving high data quality. The QPTIFF file format seamlessly integrates into PhenoImager HT 2.0 image analysis software suite (Phenochart, inForm and phenoptrReports), Akoya's software partner platforms, and open-source solutions.
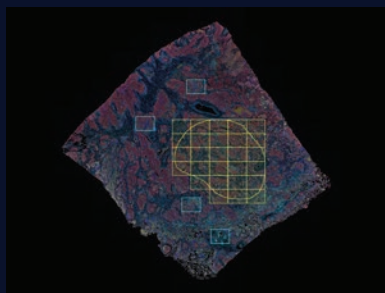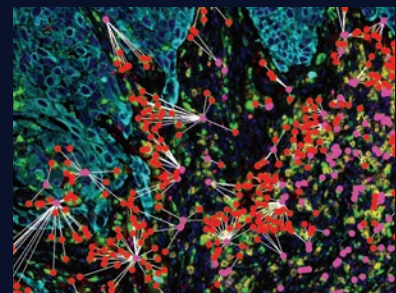


## Phenochart™ Viewer

Whole-slide contextual viewer enabling viewing and annotation
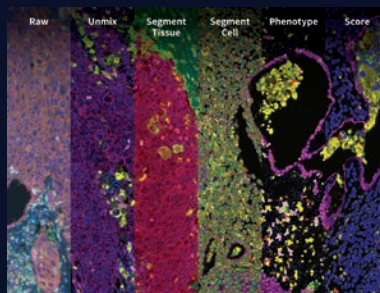


## inForm™ Software

Patented automated tissue analysis software for segmentation, phenotyping and scoring



## phenoptrReports

Powerful analytical tool to analyze spatial relationships

Learn more about software solutions for spatial signature development at **akoyabio.com/software**

CASE STUDY

## Spatial Signature End-to-End Workflow Standardization

**The First Multi-Institutional Analytical Demonstration of a Spatial Biology Workflow**

The MITRE Study established the high reproducibility and robustness of Akoya's PhenoImager platform for spatial phenotyping in clinical and translational research.

Learn more about workflow validation at **akoyabio.com/mitre-validation**



Correlation across sites
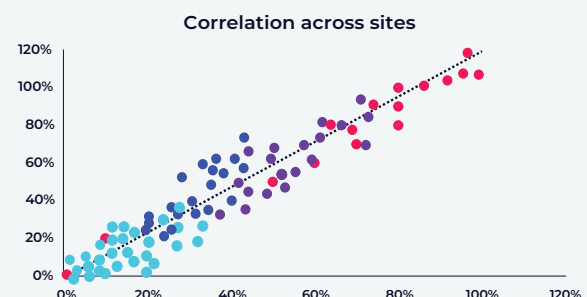
# From Spatial Discoveries to Spatial Signatures At YOUR Scale

## DISCOVERY



**PhenoCycler®-Fusion 2.0**

## TRANSLATIONAL



**PhenoImager® HT 2.0**

| DISCOVERY | | TRANSLATIONAL |
|---|---|---|
| Supports 100+ biomarkers depending on barcode compatibility | **MULTIPLEXING CAPABILITIES** | Separates up to 9 colors, even if overlapping |
| 2 slides | **SLIDE AUTOMATION** | 80 slide (with continuous loading technology) |
| 25 minutes per cycle | **SPEED (1.5 CM X 1.5 CM)** | Fluorescence: 12 min (7 colors); Brightfield: 6 min |
| Whole-slides FFPE and Fresh Frozen; Tissue sections and microarrays | **TISSUE FORMAT** | Whole-slides FFPE and Fresh Frozen; Tissue sections and microarrays |
| Fluorescence, Brightfield | **DETECTION METHOD** | Fluorescence, Brightfield |
| 10X (1.0 μm/pixel), 20X (0.5 μm/pixel) or 40X (0.25 μm/pixel) | **RESOLUTION** | 10X (1.0 μm/pixel), 20X (0.5 μm/pixel) or 40X (0.25 μm/pixel) |
| Akoya & third-party solutions | **IMAGE ANALYSIS SOFTWARE** | inForm®, phenoptrReports & third-party solutions |
| Akoya Biosciences' whole-slide scan image (QPTIFF) | **FILE FORMATS** | Akoya Biosciences' whole-slide scan image (.QPTIFF), Multispectral images (.im3), color images (.JPEG, .BMP, .PNG) |



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