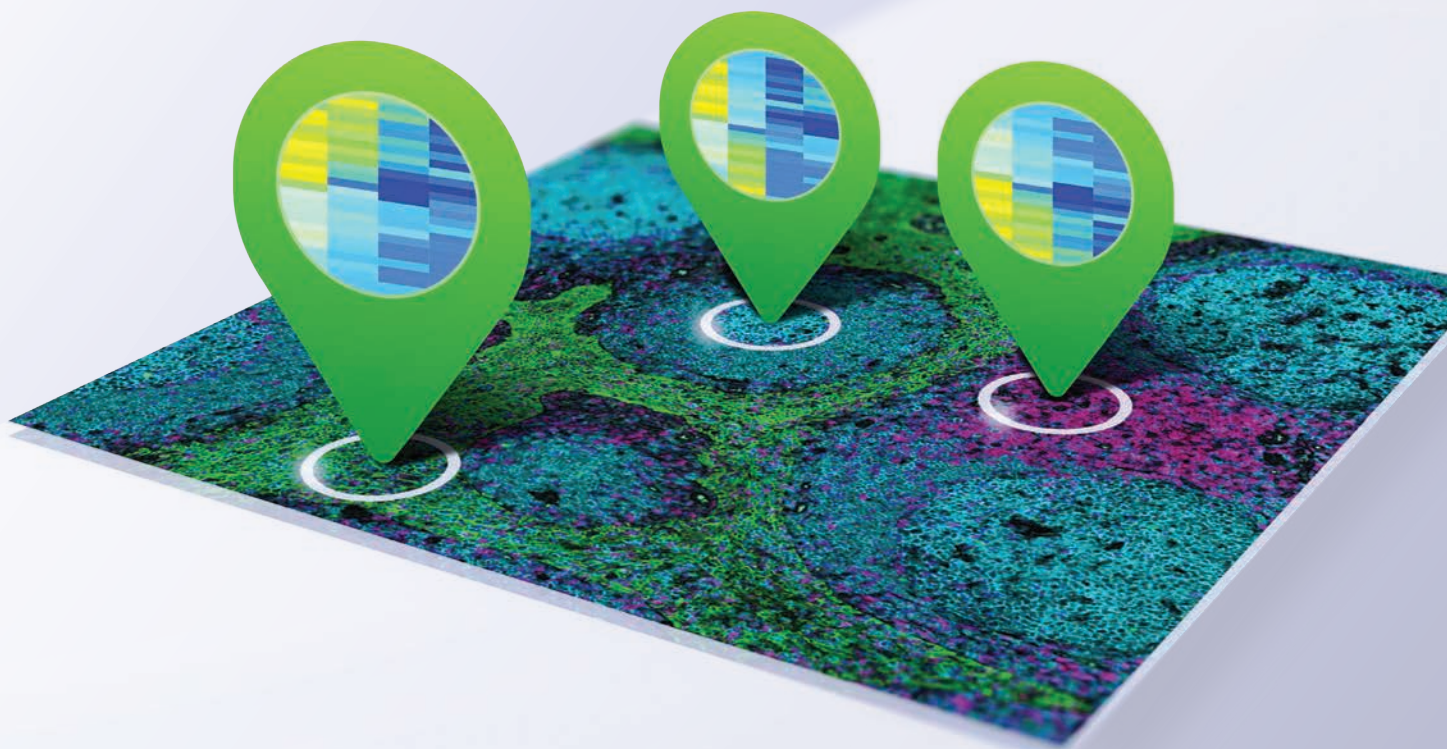


GeoMx™

# Digital Spatial Profiler

Your GPS for Biology



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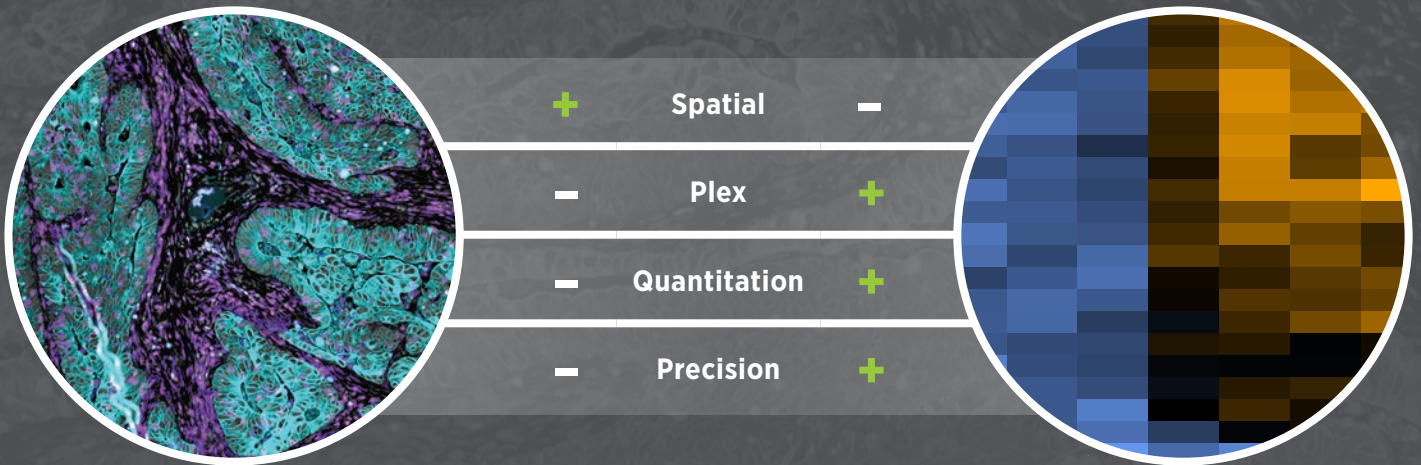
# Resolving Sample Heterogeneity

## Spatial information or high-plex: The tradeoff

Understanding tissue heterogeneity is critical to answering key biological questions in translational research. The current tissue analysis paradigm requires a tradeoff between morphological analysis or high-plex, sacrificing valuable information or consuming precious samples.

### In situ Visualization Technology (FISH/ IHC)

### Molecular Profiling Technologies





# Introducing GeoMx™ DSP

## Your GPS for biology

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NanoString's GeoMx Digital Spatial Profiler (DSP) combines the best of spatial and molecular profiling technologies by generating a whole tissue image at single cell resolution and digital profiling data for 10's-1,000's of RNA or Protein analytes for up to 12 tissue slides per day. This unique combination of high-plex, high-throughput spatial profiling enables researchers to rapidly and quantitatively assess the biological implications of the heterogeneity within tissue samples.



HIGH-PLEX

HIGH-  
THROUGHPUT

MULTI-  
ANALYTE

QUANTITATIVE

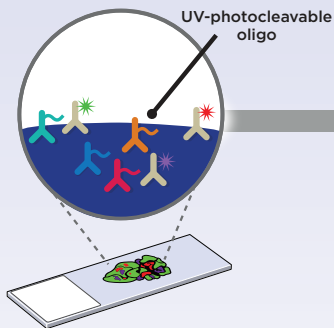
NON-  
DESTRUCTIVE

# The Path is Clear

## GeoMx DSP Workflow

### 1. Prepare Tissue

A 5 micron section is simultaneously stained with imaging and profiling reagents.

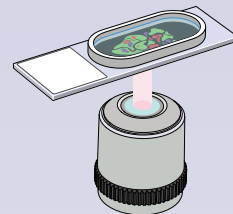


**Imaging reagents:** Up to 4 fluorescent morphology markers

**Profiling reagents:** 10's to 1000's of RNA or protein detection reagents barcoded with unique photocleavable oligonucleotides

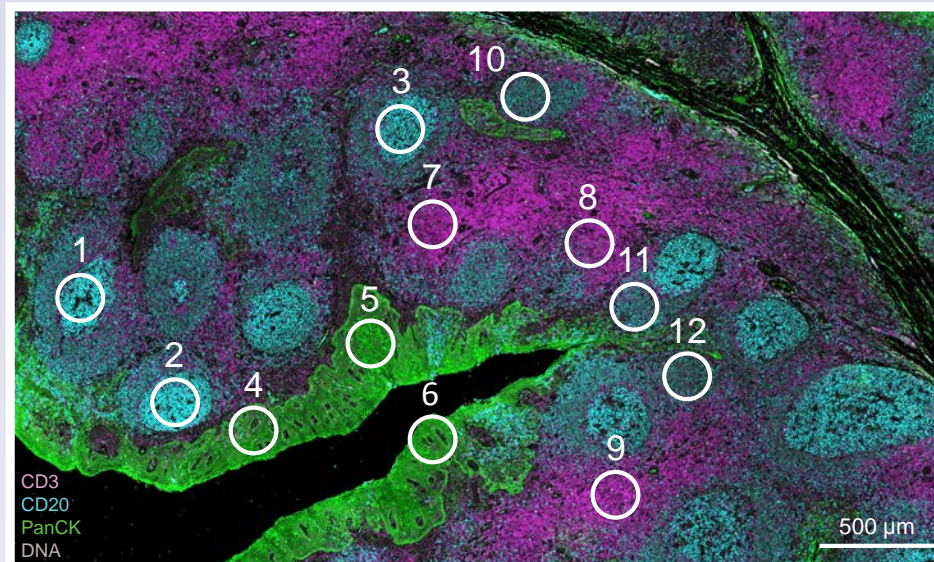
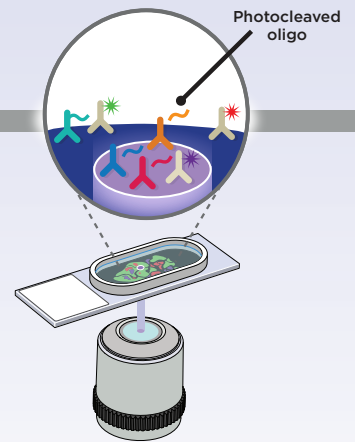
### 2. Select ROI

An intuitive interface allows users to select regions of interest of virtually any shape or size.



### 3. Illuminate ROI

Every region of interest is sequentially exposed to UV light to decouple the oligonucleotides from the profiling reagents.







# Locate Your Regions of Interest

**Tunable, light-directed selection enables dynamic profiling modalities**

## Geometric Profiling

Assess tissue heterogeneity and profile standardized geometric shapes across distinct tissue regions

## Rare Cell Profiling

Cell type-specific morphology markers guide profiling, revealing the function of distinct cell populations

## Gridded Profiling

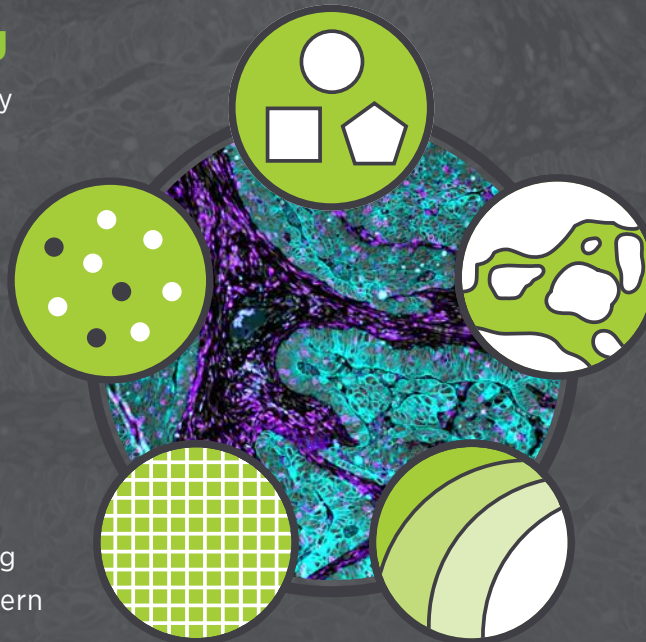
Perform deep spatial mapping using a tunable gridding pattern

## Segment Profiling

Maximize cellularity using morphology markers to identify and profile distinct biological compartments within an ROI

## Contour Profiling

Evaluate how proximity affects biological response and the local microenvironment around a central structure using radiating ROI



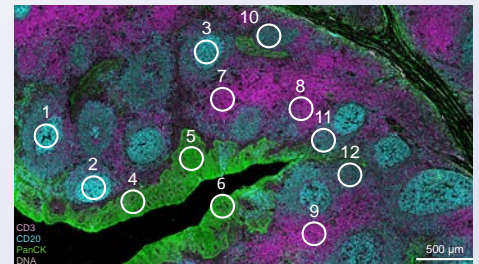
# Biological questions inform modality selection



## Geometric Profiling

*How does the expression of tumor and immune markers differ across a sample?*

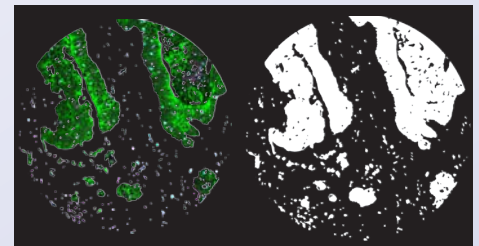
Geometric profiling identifies distinct expression profiles across and within specific regions of the tissue



## Segment Profiling

*How does the tumor differ from the tumor microenvironment?*

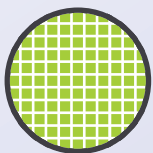
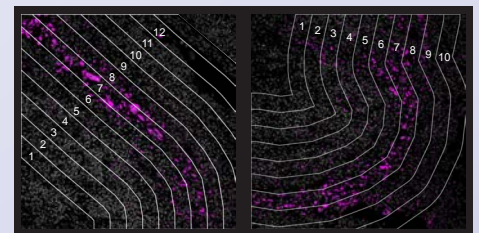
Segment profiling reveals unique tumor and tumor microenvironment molecular profiles



## Contour Profiling

*How does proximity to the tumor or an immune cell population alter biological response?*

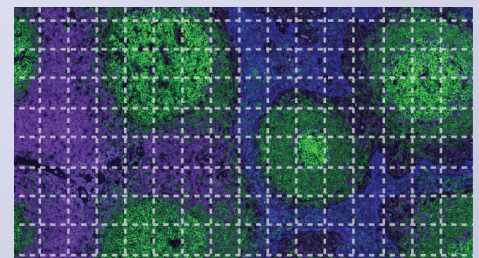
Radiating ROI surrounding macrophages show distinct expression profiles based on proximity



## Gridded Profiling

*What novel biology is uncovered with deep spatial mapping of the tumor?*

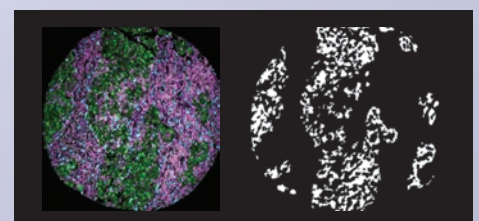
Gridded profiling provides a digital map of the molecular profile of the tumor



## Rare Cell Profiling

*How do rare immune cells impact tumor biology and therapeutic response?*

Isolated immune cell populations show unique expression profiles





# Explore Your Data

## 100% traceability from profiling data to tissue image:

When specific profiling data is selected the GeoMx Data Analysis tool will automatically show the tissue image corresponding to a ROI and vice versa.

Image of ROI  
4 of 24  
(stroma)

**GeoMx™ DSP Analysis Suite**  
Version 1.0  
GEOMX-DEV5

Data Collection Records Data A

QC Scaling Normalization Background correction Ratio builder Statistical tests Custom scripts Save

CRC RNA DSP 032019 - ERCC normalized counts  
Select all Deselect all Deselect filtered Select filtered

Slides: 4  
Segments: 84  
Selected segments: 84

Manage annotations

DSP-104-JM-S1-Scan Tags: Geo, Invasive margin, CRC58, ... +4 more 12 Segments 12 selected segments

DSP-104-JM-S2-Scan Tags: Tumor, Immune-deprived tumor, CRC36, ... +6 more 24 Segments 24 selected segments

Datasets  
History  
 Initial Dataset  
 ERCC normalized counts  
 HK norm  
 Neg Geo Norm  
 asdfasdf

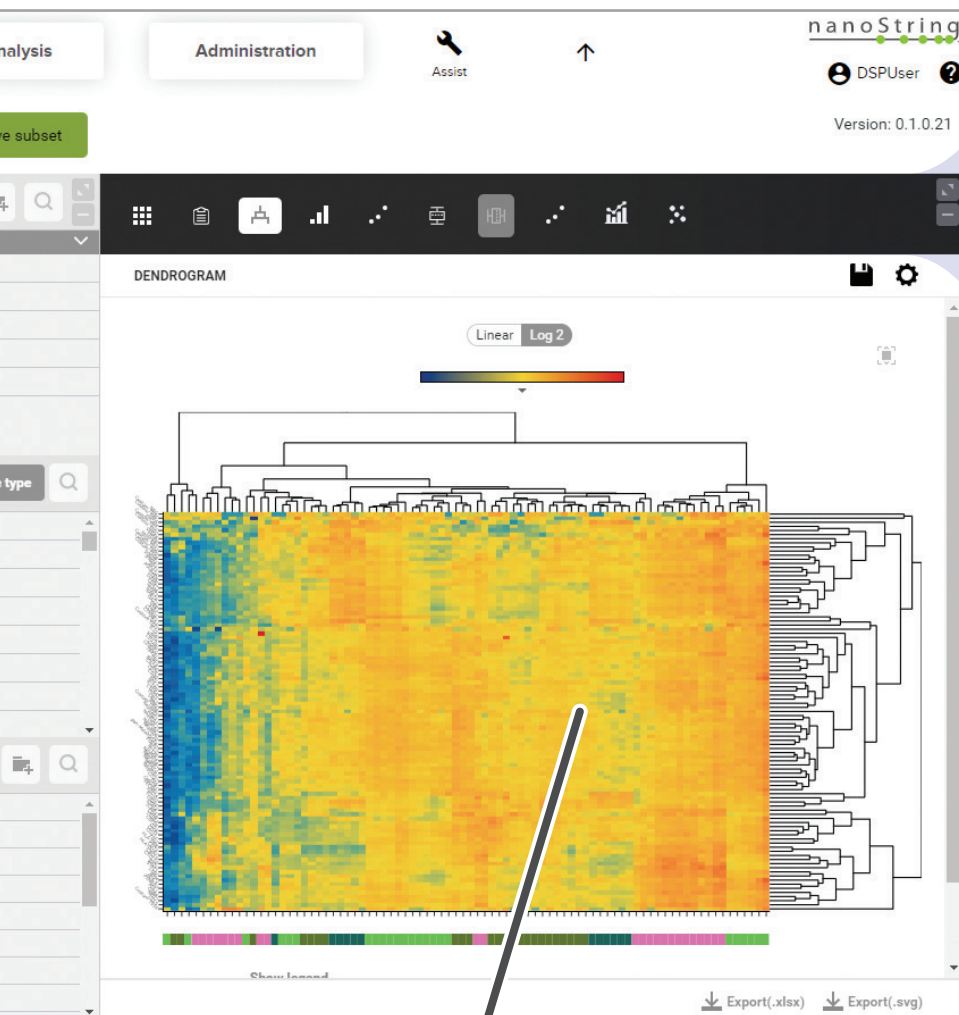
Probes  
Analyte  
 4-1BB  
 AKT1  
 ARG1  
 B2M  
 B7-H3  
 BATF3  
 BCL2  
 CCL5

Probe groups Segment groups  
 Apoptosis  
 Developmental Biology  
 Disease  
 Metabolism of proteins  
 Hemostasis  
 Generic Transcription Pathway  
 Metabolism  
 Integrin cell surface interaction



# GeoMx DSP provides an integrated environment

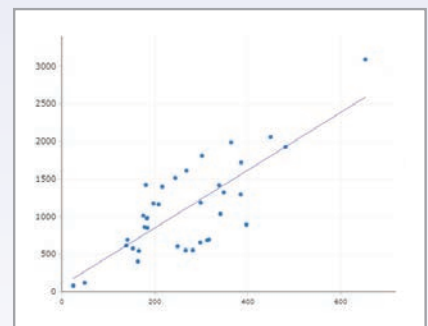
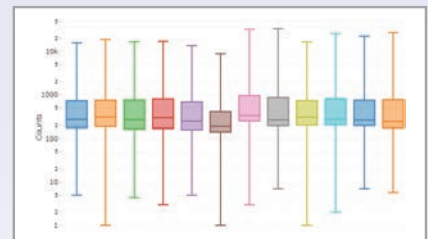
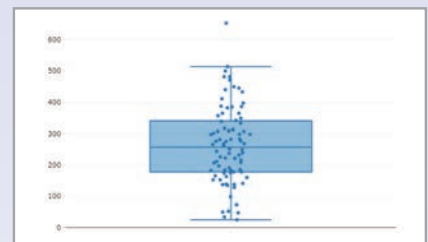
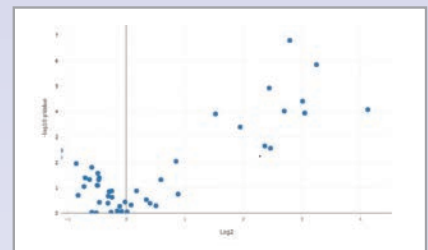
- **Easy to streamline** - seamless integration to easily go from data collection to data analysis
- **Easy to analyze** - imaging and profiling data are always connected
- **Easy to collaborate** - multi-user access to data at the same time



Profiling data  
from ROI  
4 of 24  
(stroma)

## Visualize Your Data in Multiple Ways

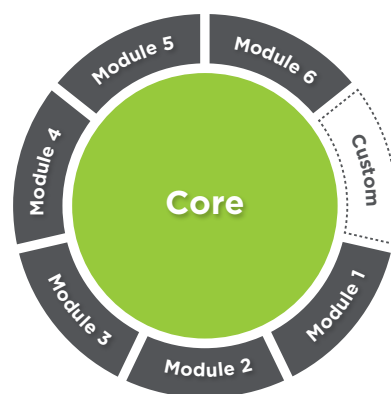
Choose from a variety of data views, including box plot, scatter plot, volcano plot, strip plot and more!



# Discover Your Biomarker

## Flexible, pre-verified content to fit a range of research needs

GeoMx assays are modular and optimized for robust performance across samples. Select one core and up to 6 modules to analyze up to 96 targets on a single slide. Available content covers immunology, immuno-oncology, neurodegeneration, and neuroinflammation. Additionally, user-defined protein or RNA content can be added using our Protein Barcoding Service and Custom RNA offering.



Available content covers immunology, immuno-oncology, neurodegeneration, and neuroinflammation with a rapidly growing pipeline\*

	Immuno-Oncology	Neuroscience
<b>Protein Cores</b>	<b>Immune Cell Profiling</b> 18-plex Human/Mouse	<b>Neural Cell Profiling</b> 20-plex Human
<b>Protein Modules</b>	<b>IO Drug Target</b> 6-10-plex Human/Mouse	<b>Alzheimer's Pathology</b> 10-plex Human
	<b>Immune Activation Status</b> 8-plex Human Mouse*	<b>Parkinson's Pathology</b> 10-plex Human
	<b>Immune Cell Typing</b> 7-plex Human Mouse*	<b>Alzheimer's Pathology 2</b> ~10-plex*
	<b>Pan-Tumor</b> 9-plex Human Mouse*	<b>Autophagy</b> ~10-plex*
	<b>Cell Death</b> ~10-plex Human*	<b>Glial Cell Subtyping</b> ~10-plex*
	<b>PI3K/AKT Signaling</b> ~10-plex Human*	
	<b>MAPK Signaling</b> ~10-plex Human*	
<b>Custom Modules</b>	Available	Available
<b>RNA Cores</b>	<b>Immune Pathways</b> 84-plex Human	

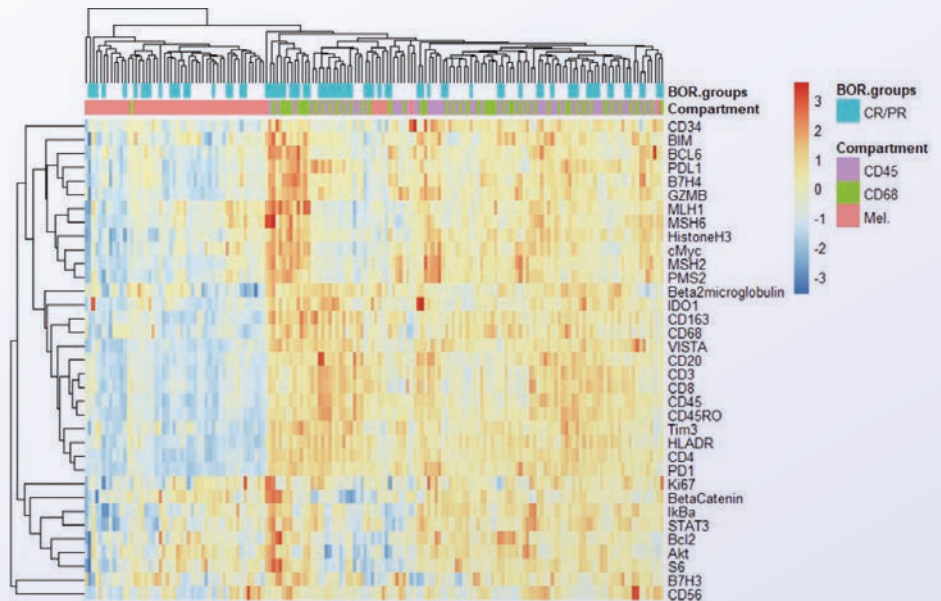
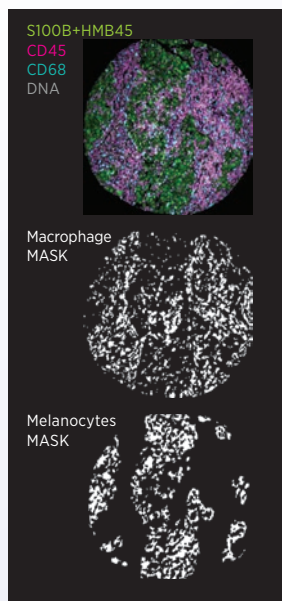
\*Panel concepts and offerings subject to change prior to commercial launch

# Case Study: Identification of predictive biomarkers for immune checkpoint in melanoma

**Background:** Emerging immuno-therapeutic strategies require predictive biomarkers to select more patients with a positive clinical outcome and reduce toxicity

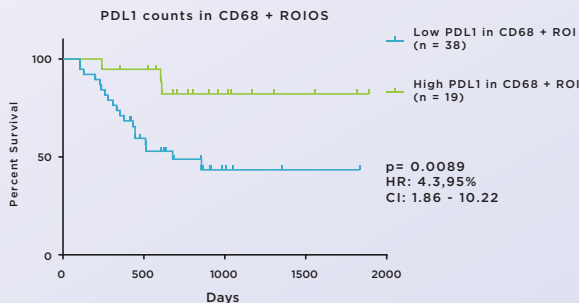
**Experimental design:** 44 protein targets spatially profiled across 3 unique compartments (macrophage, leukocytes, and melanocyte) from each melanoma biopsy obtained across 59 immunotherapy-treated patients using rare cell profiling

**Results:** 5 compartment-specific biomarkers discovered

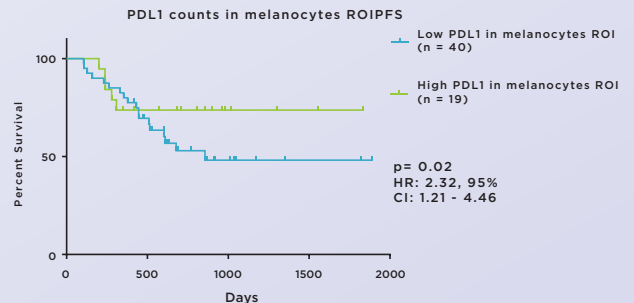


## High PD-L1 expression in macrophages is associated with prolonged survival

### PD-L1 in macrophage (CD68+) ROI



### PD-L1 in melanocyte (mel.) ROI



OS

Data courtesy of David Rimm, MD, PhD, Yale University



## Draft Specifications

Category	Feature	Specification
DSP Instrument	Sample Throughput	Up to 12 slides/day
	Minimum UV Illumination Area	5um <sup>2</sup> area
	Resolution	20X; 0.45 NA objective
	Visualization Channels	4 Fluorescent Channels (representative dye): FITC (SYTO13), CY3 (AF532), Texas Red (AF594), CY5 (AF647)
	Visualization Modes	Fluorescent
	Slide Capacity	Four 1 x 3in slides
	On Instrument Data Storage Capacity	8TB (> 300 10mm x 10mm 4 channel slide images)
	Long Term Data Storage	Customer-provided fileshare (local network)
	ROI Definition	On-instrument or remotely via web browser
	ROI Selection	Manual
	Instrument Dimensions	Actual: 30" x 29" x 24"/76cm x 73cm x 61cm
	Instrument Weight	220 lb/100 kg
	Power source	110-240 VAC, 50/60Hz, 440VA
	Readout Instrument Compatibility	nCounter, Illumina NGS
	Image Export	Single-channel Pyramidal TIFF; monochrome or color images (JPEG, PNG, WEBP)
DSP Reagents	Supported Analytes	Protein and RNA
	Chemistry Multiplexing Platform Capabilities	Up to 800 plex for nCounter, 20K plex for NGS
nCounter Readout Performance	Readout Sensitivity	5,000 photocleaved barcodes
Data Analysis Software	Data Visualization and Analysis	Intuitive and interactive interface that automatically connects quantitative readout with spatial information. Workflow includes QC and normalization. Visualization include clusters, heatmaps, volcano plots, bar graphs, box plots, strip plots, scatter plots, correlation plots.
	Data Export	.xlsx file format for raw or calibrated data
	Image Export	.svg format for publication-worthy visualization plots

## GeoMx Digital Spatial Profiler

Product	Description	Catalog Number
GeoMx Digital Spatial Profiler	GeoMx™ Digital Spatial Profiler Analysis Instrument. Includes 1 year manufacturers warranty.	GMX-DSP-1Y
	GeoMx™ Digital Spatial Profiler Analysis Instrument. Includes 1 year manufacturers warranty and 1 year service contract.	GMX-DSP-2Y
	GeoMx™ Digital Spatial Profiler Analysis Instrument. Includes 1 year manufacturers warranty and 2 year service contract.	GMX-DSP-3Y
	GeoMx™ Digital Spatial Profiler Analysis Instrument. Includes 1 year manufacturers warranty and 3 year service contract.	GMX-DSP-4Y
	GeoMx™ Digital Spatial Profiler Analysis Instrument. Includes 1 year manufacturers warranty and 4 year service contract.	GMX-DSP-5Y

## Ancillary Products

Product	Description	Catalog Number
GeoMx™ Digital Spatial Profiler Slide Tray	Additional 4-slide holder	GMX-DSP-TRAY

For more information, visit [nanosttring.com/GeoMxDSP](https://nanosttring.com/GeoMxDSP).

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