

Digital Spatial Profiler

FOR RESEARCH USE ONLY. Not for use in diagnostic procedures.

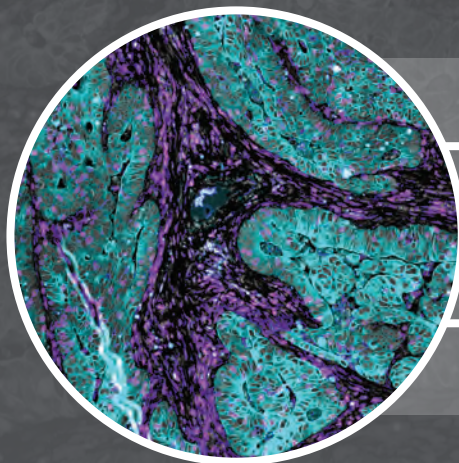
nanosString

Resolving Sample Heterogeneity

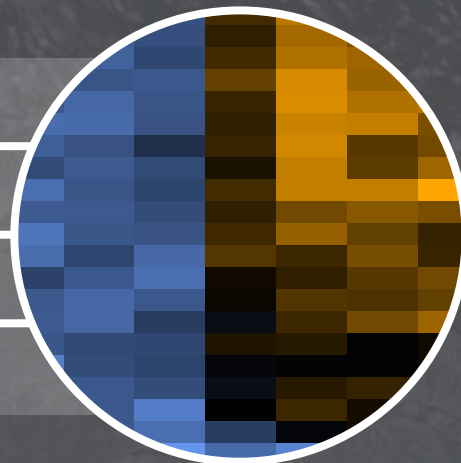
Spatial information or high-plex: The tradeoff

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)



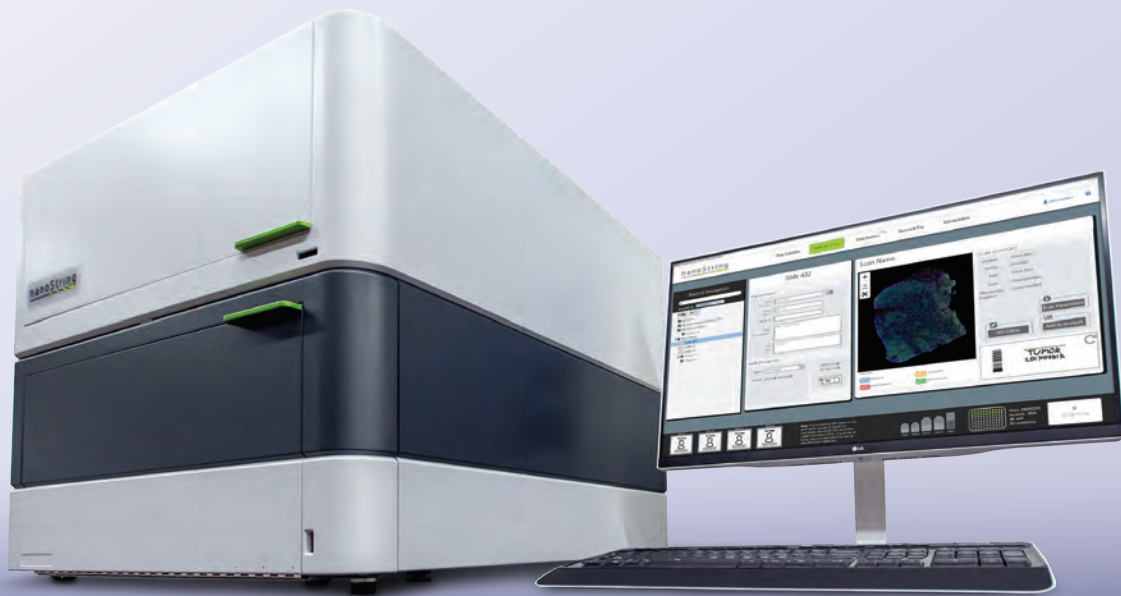
Molecular Profiling Technologies



+	Spatial	-
-	Plex	+
-	Quantitation	+
-	Precision	+

Introducing **GeoMx™ DSP** Your GPS for biology

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

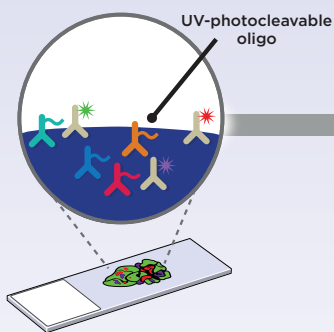
NON-
DESTRUCTIVE

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

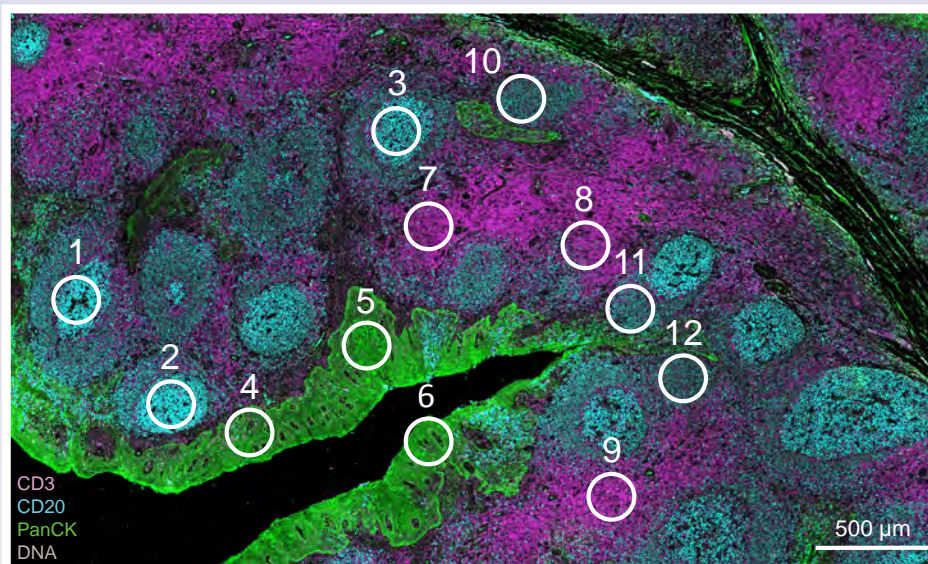
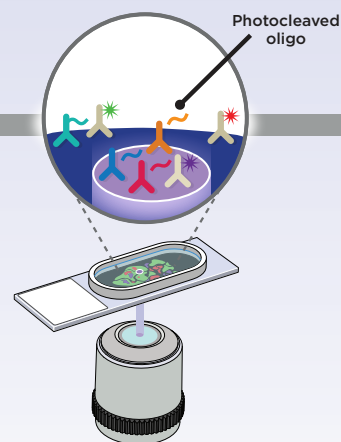
2. Select ROI

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



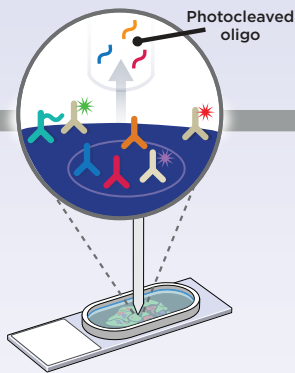
3. Illuminate ROI

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



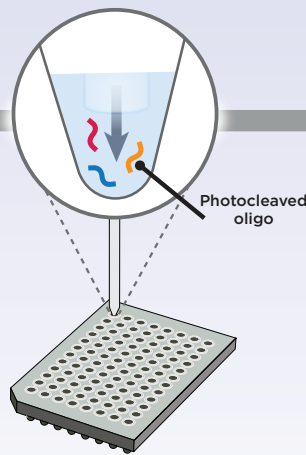
4. Aspirate Oligos

Decoupled oligonucleotides are rapidly aspirated using a microcapillary without touching the sample, thereby leaving the sample unaltered.



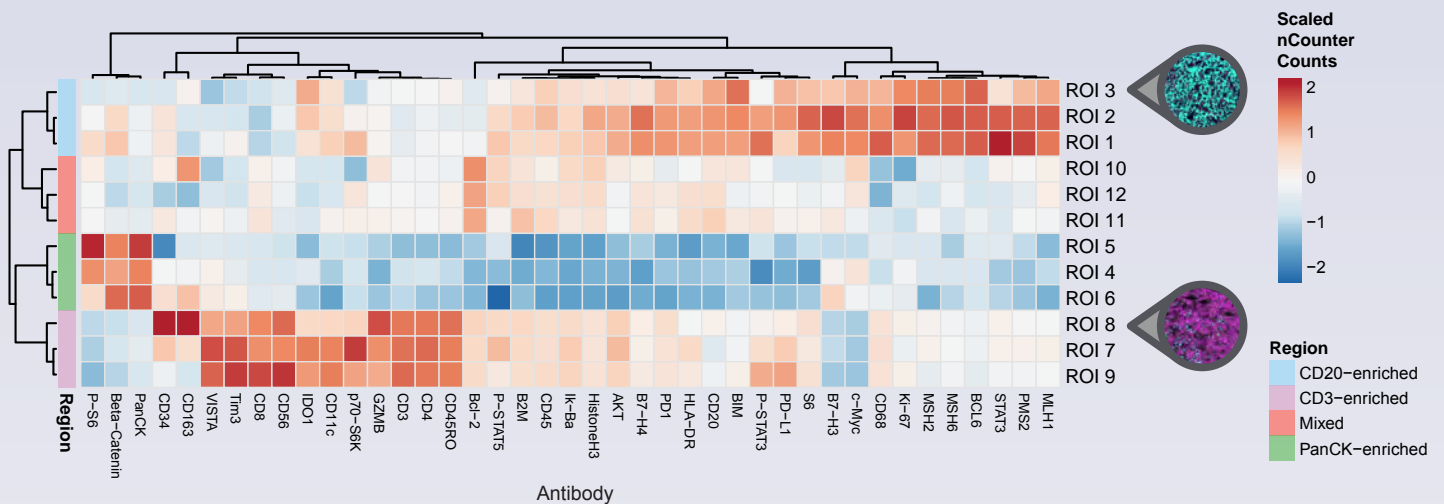
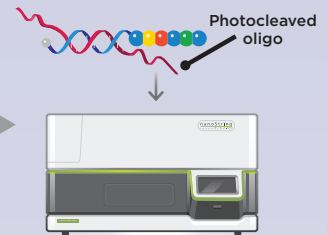
5. Dispense Oligos

Oligonucleotides are deposited into wells of a microtiter plate, and the information contained within each well is indexed to the ROI on the tissue.



6. Count Barcodes

The oligonucleotides are hybridized to NanoString® barcodes and quantitated on the nCounter platform.



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

Segment Profiling

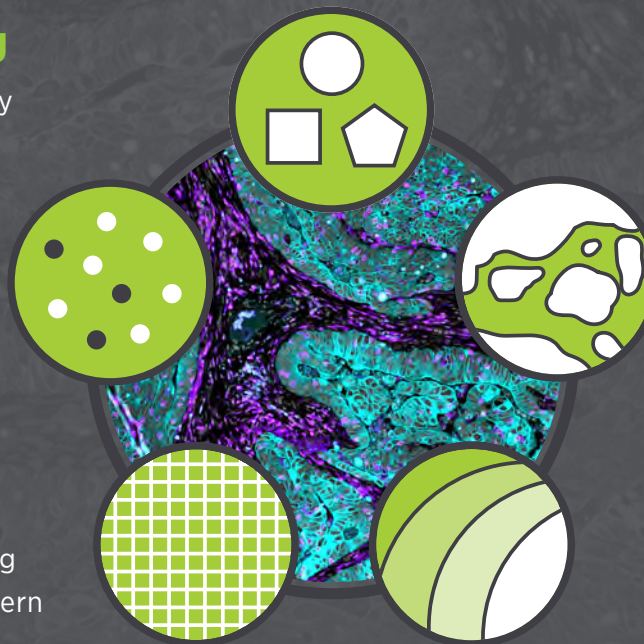
Maximize cellularity using morphology markers to identify and profile distinct biological compartments within an ROI

Gridded Profiling

Perform deep spatial mapping using a tunable gridding pattern

Contour Profiling

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



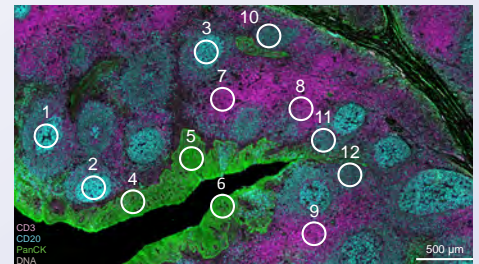
Biological questions inform modality selection



Geometric Profiling

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

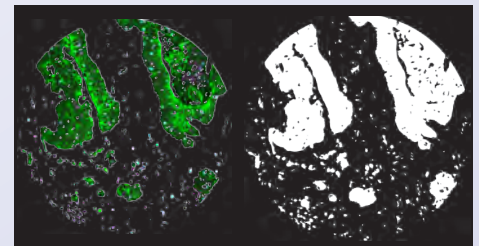
Geometric profiling identifies distinct expression profiles across and within specific regions of the tissue



Segment Profiling

How does the tumor differ from the tumor microenvironment?

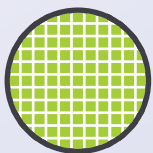
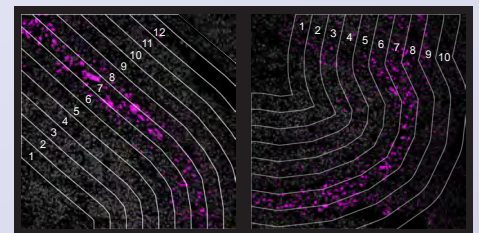
Segment profiling reveals unique tumor and tumor microenvironment molecular profiles



Contour Profiling

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

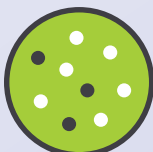
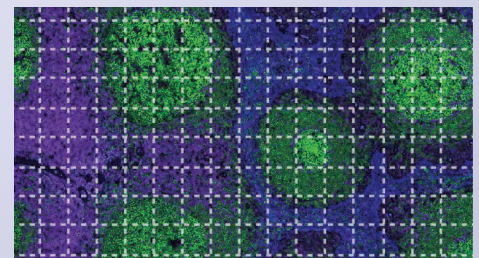
Radiating ROI surrounding macrophages show distinct expression profiles based on proximity



Gridded Profiling

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

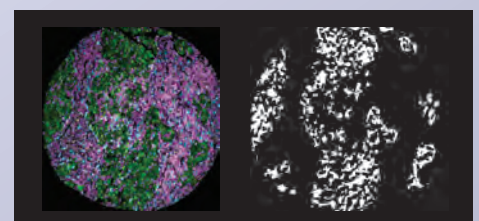
Gridded profiling provides a digital map of the molecular profile of the tumor



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)

The screenshot displays the GeoMx DSP Analysis Suite interface. At the top, the title bar reads "GeoMx™ DSP Analysis Suite" with "Version 1.0" and "GEOMX-DEV5" below it. A navigation bar includes tabs for "Data Collection", "Records", and "Data Analysis". Below this is a toolbar with buttons for "QC", "Scaling", "Normalization", "Background correction", "Ratio builder", "Statistical tests", "Custom scripts", and "Save".

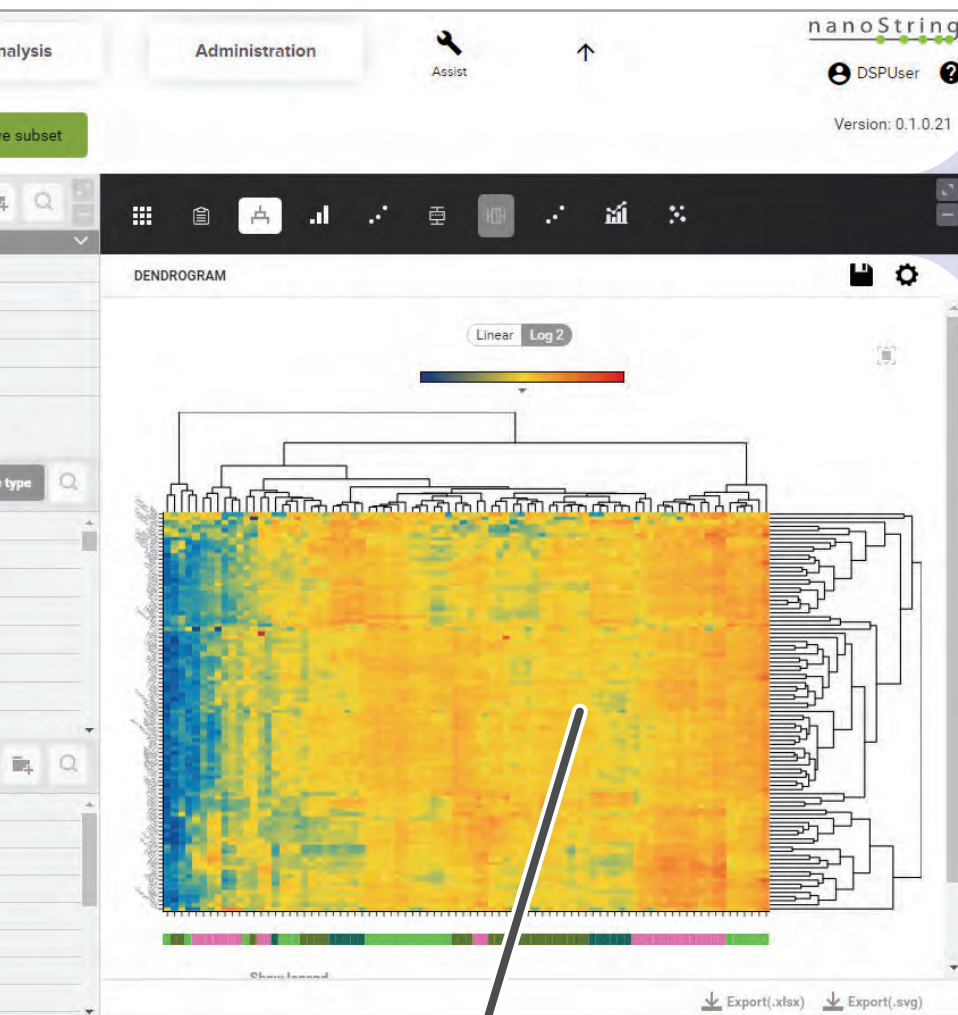
The main workspace is divided into several sections. On the left, a panel shows "CRC RNA DSP 032019 - ERCC normalized counts" with options to "Select all", "Deselect all", "Deselect filtered", and "Select filtered". Below this, it indicates "Slides: 4", "Segments: 84", and "Selected segments: 84". A "Manage annotations" button is present.

The central area displays a tissue image with various regions of interest (ROIs) highlighted in yellow and numbered (e.g., 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012). A callout box points to ROI 4, labeled "Image of ROI 4 of 24 (stroma)". To the right of the image, there are two rows of circular icons representing different segments, with the first row showing 12 segments and the second row showing 24 segments.

On the right side, a sidebar contains a "Datasets" section with a "History" list including "Initial Dataset", "ERCC normalized counts", "HK norm", "Neg Geo Norm", and "asdfsdf". Below this is a "Probes" section with a list of genes: "4-1BB", "AKT1", "ARG1", "B2M", "B7-H3", "BATF3", "BCL2", and "CCL5". At the bottom of the sidebar, there are "Protein groups" and "Segment groups" sections, each with a list of biological processes such as "Apoptosis", "Developmental Biology", "Disease", "Metabolism of proteins", "Hemostasis", "Generic Transcription Pathway", "Metabolism", and "Integrin cell surface interaction".

GeoMx DSP provides an integrated environment

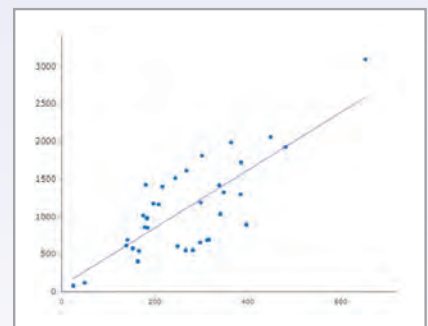
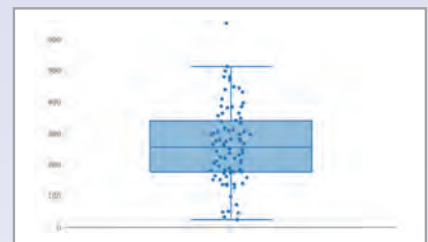
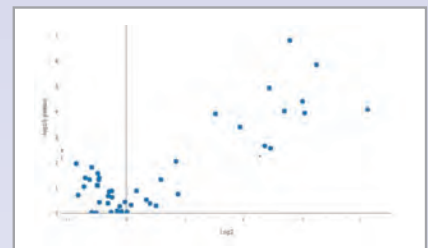
- **Easy to streamline** - seamless integration to easily go from data collection to data analysis
- **Easy to analyze** - imaging and profiling data are always connected
- **Easy to collaborate** - multi-user access to data at the same time



Profiling data
from ROI
4 of 24
(stroma)

Visualize Your Data in Multiple Ways

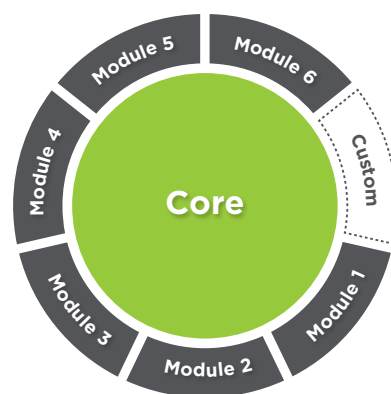
Choose from a variety of data views, including box plot, scatter plot, volcano plot, strip plot and more!



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

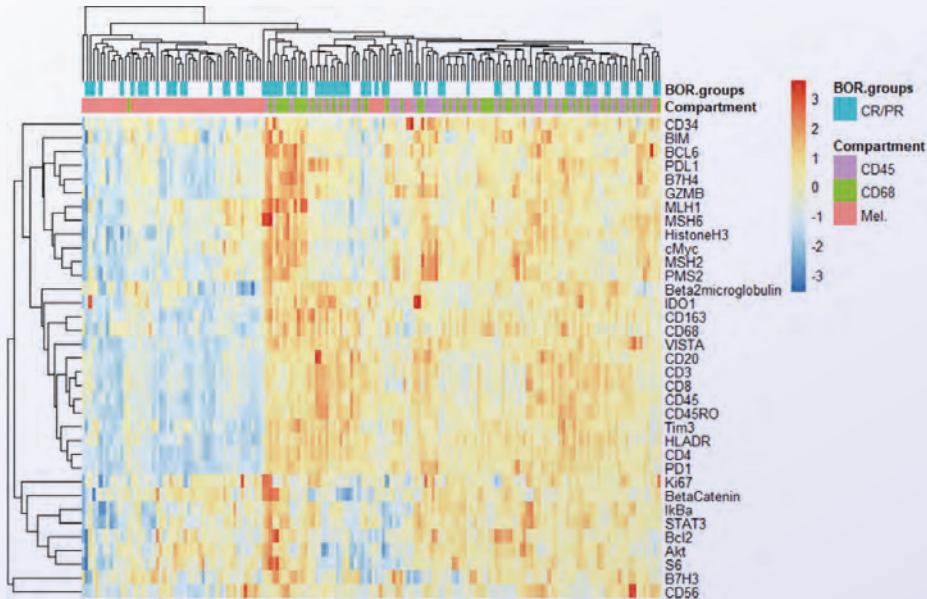
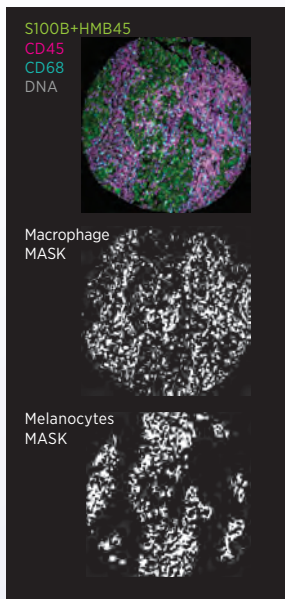
*Panel concepts and offerings subject to change prior to commercial launch

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

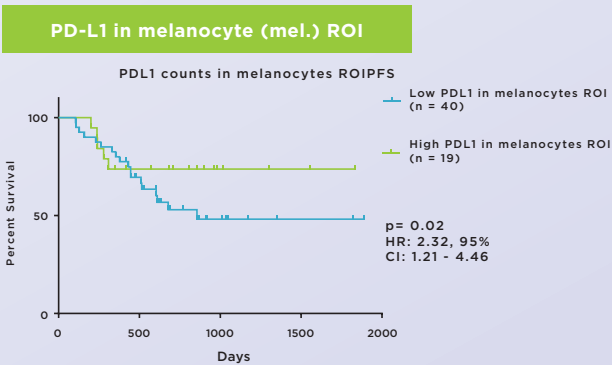
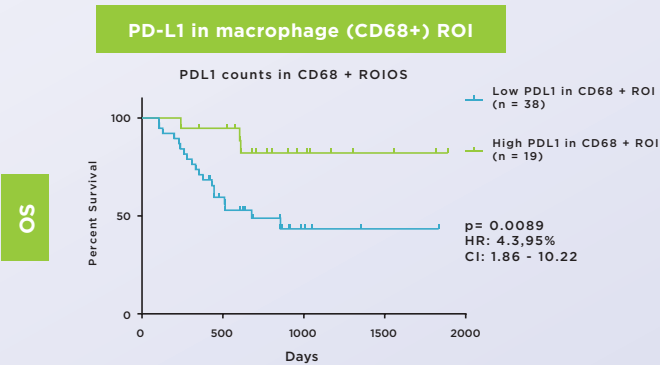
Background: Emerging immuno-therapeutic strategies require predictive biomarkers to select more patients with a positive clinical outcome and reduce toxicity

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



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 ² 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.

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