# NanoString Highlights Record Number of nCounter and GeoMx Research Studies at 2019 American Association of Cancer Research (AACR) Conference

March 26, 2019

**Approximately 70 Abstracts Showcase NanoString's Platforms, Including 13 Studies Using the GeoMx Digital Spatial Profiler**

SEATTLE, March 26, 2019 (GLOBE NEWSWIRE) -- NanoString Technologies, Inc. (NASDAQ:NSTG), a provider of life science tools for translational research and molecular diagnostic products, today announced that a record number of studies enabled by the company's nCounter® Analysis System and GeoMx™ Digital Spatial Profiler will be presented at theAmerican Association of Cancer Research (AACR) meeting being held in Atlanta, Georgia, March 30th – April 3rd.

Approximately 70 abstracts using NanoString's products will be presented at AACR, spanning applications such as gene expression profiling in cancer and immunotherapy using the nCounter Analysis System, as well as highly multiplexed quantification of protein and RNA using the GeoMx Digital Spatial Profiler (DSP).

"We are thrilled to see the continued growth in translational research studies using our platforms to answer key questions in oncology research," said Brad Gray, president and CEO of NanoString. "Many of these studies feature our latest nCounter panels for immuno-oncology and CAR-T characterization. We are particularly excited to showcase more than a dozen abstracts that feature our latest innovation, the GeoMx Digital Spatial Profiler."

GeoMx DSP enables high throughput multiplex spatial profiling of RNA and protein targets in a variety of sample types, including FFPE tissue sections. There will be thirteen GeoMx DSP abstracts presented at AACR, including nine posters that will be presented by customers, collaborators and GeoMx DSP beta sites.

To learn more about GeoMx DSP, please visit https://www.nanostring.com/scientific-content/technology-overview/digital-spatial-profiling-technology

**GeoMx DSP Events**

**GeoMx DSP Launch Celebration:**NanoString will hold a celebration of the launch of the GeoMx Digital Spatial Profiler on Monday, April 1st from 6:30pm-9:30pm ET at the Georgia Aquarium.

**DSP Spotlight Theater:** A technology workshop focused on GeoMx DSP will take place on Tuesday, April 2 from 10:00am-11:00am ET in Spotlight Theater A, entitled "Multi-Analyte Profiling of the Tumor and Microenvironment on FFPE with Spatial Resolution to Identify Candidate Biomarkers in Breast Cancer." The featured speakers are Christina Curtis, Ph.D., of Stanford University School of Medicine, and Aubrey Thompson, Ph.D., of the Mayo Clinic Comprehensive Cancer Center.

**GeoMx DSP Studies – Customer Authors**

**Title: Integrating bulk and spatial profiling technologies for the discovery of RNA and protein biomarkers in muscle invasive bladder cancer**

Lead author: Zhaojie Zhang, Ph.D., H3 Biomedicine, Cambridge, MA, USA

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract #: 498, section 20

Description: This translational research case study combines standard bulk gene expression profiling with spatial RNA and protein profiling to characterize the immune microenvironment in patients with bladder cancer. This study reveals the importance of molecular phenotyping infiltrated immune cells versus excluded immune cells which can only be done through spatial profiling. The molecular phenotype obtained through spatial profiling provided insights towards designing effective immuno-therapies.

**Title: NanoString® GeoMx™ digital spatial profiling further defines the role of B cells in the response to immune checkpoint blockade**

Lead author: Beth A. Helmink, M.D., Ph.D., MD Anderson Cancer Center, Houston, TX, USA

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract #: 499, section 20

Description**:** This study is a follow-on to one of the GeoMx DSP papers published in Nature Medicine by Dr. Jennifer Wargo (Nat Med. 2018 Nov;24(11)). The new study builds on observations of the original work to further investigate the role of T cells, B cells and tertiary lymphoid structures in metastatic melanoma. It leveraged rare cell profiling and a 60+ plex protein panel to characterize immune changes associated with neoadjuvant immunotherapy.

**Title: Combinatorial strategies for tissue characterization with advanced image analysis and digital spatial profiling**

Lead author: Raffaele De Filippis, Ph.D., University of St. Andrews, St. Andrews, United Kingdom

Date/Time: Monday, April 1, 8:00am – 12:00pm ET

Abstract #: 1083, section 5

Description: This study characterizes renal cell carcinoma utilizing a combination of GeoMx DSP and advanced tissue profiling using machine learning algorithms (Definiens Tissue Studio®) for image analysis. A tissue microarray of more than 75 tumor biopsies was profiled using geometric profiling strategies to characterize patterns of protein expression associated with metastatic progression. The GeoMx data is supported by detailed image analysis that provides insight into the distribution of the immune response within the tumors.

**Title: High-plex spatial profiling analysis of multidrug CIVO microdose studies in cancer patients**

Lead author: Gary B. Deutsch, M.D., M.P.H., Hofstra Northwell School of Medicine, Lake Success, NY, USA

Date/Time: Monday, April 1, 1:00pm – 5:00pm ET

Abstract #: 2155, section 13

Description: A unique study evaluating the changes in spatial expression upon intratumoral microdosing of various drugs. Study revealed differential expression patterns in phospho proteins like S6 and ERK caused by microdosing of doxorubicin.

**Title: Comprehensive multiplexed protein analysis of biomarkers of hypoxia and the immune microenvironment of diffuse large B-cell lymphoma with clinical outcome analysis**

Lead author: Vladislav V. Makarenko, M.D., University of Massachusetts, Worcester, MA, USA

Date/Time: Monday, April 1, 1:00pm – 5:00pm ET

Abstract #: 2376, section 24

Description: A pilot study aimed at elucidating the impact of hypoxic markers like HIF1a and HIF2a in the tumor microenvironment. Spatial profiling of immune protein targets revealed a number of targets (PDL1, LAG3 and B7-H3) associated with HIF1a and not HIF2a. This association explains poor outcome associated with patients with high HIF1a expression level and suggests potential immuno-therapy strategies that are distinct from patients with HIF2a.

**Title: High density of CD68+HLA-DR- macrophages in the stroma of primary melanoma correlates with an unfavorable immune microenvironment as assessed by Digital Spatial Profiling with clinical outcome analysis**

Lead author: Emanuelle M. Rizk, B.A., Columbia University, NY, NY, USA

Date/Time: Tuesday, April 2, 8:00am – 12:00pm ET

Abstract #: 2798, section 3

Description: This study highlights the importance of measuring expression levels in tissue compartments rather than in bulk to tease out subtle changes in the tumor microenvironment. Here spatial protein profiling was performed in compartments with high macrophage density. Differential expression was observed in high macrophage comparments in close proximity to cytotoxic lymphocytes which was predictive of poor prognosis. This study highlights the importance of studying the location of macrophages within the tumor microenvironment.

**Title: Comparison of neoadjuvant FOLFIRINOX alone vs FOLFIRINOX + stereotactic body radiation as immune-modulators of the pancreatic adenocarcinoma microenvironment with clinical outcome analysis**

Lead author: Matthew R. Farren, Ph.D., Winship Cancer Institute, Emory University, Atlanta, GA, USA

Date/Time: Tuesday, April 2, 1:00pm – 5:00pm ET

Abstract #: 3967, section 18

Description: This study is aimed at discovering targets for immuno-therapy in diseases like pancreatic cancer, for which no immunotherapy exists today. A number of putative targets for immunotherapy were discovered by performing standard bulk gene expression profiling and spatial protein profiling on samples from patients treated with neoadjuvant therapy.

**Title: Evaluation of the NanoString's Digital Spatial Profiling (DSP) Technology in Formalin-Fixed Paraffin Embedded (FFPE) cell line mixtures, PBMCs and Non-Small Cell Lung Cancer (NSCLC) tissues with clinical outcome analysis**

Lead author: Joshua Rusboldt, Ph.D., Janssen RD, Spring House, PA, USA

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract #: 4691, section 9

Description: A technology validation study shows high correlation between digital spatial profiling and standard immunohistochemistry. Moreover, the quantitative ability of DSP was benchmarked to standard flow cytometry and was found to have high levels of correlation (R2>0.9)

**Title: Digital spatial profiling of molecular responses to nanoparticle STING agonists identify S100A9 and B7-H3 as possible escape mechanisms with clinical outcome analysis**

Lead author: John T. Wilson, Ph.D., Vanderbilt University Medical Center, Nashville, TN, USA

Date/Time: Wednesday, April 3, 8:00am – 12:00pm ET

Abstract #: 4978, section 24

Description: This study demonstrates the ability of digital spatial profiling to elucidate therapeutic mechanisms of action. Syngeneic melanoma mouse models treated with STING agonists were spatial profiled for protein expression to understand changes to the immune microenvironment. This study also highlights the power of spatially profiling small features such as draining lymph nodes among a large tissue, revealing molecular phenotypes that would be missed using standard bulk gene expression analysis.

**GeoMx DSP Studies – Company Authors**

**Title: Multiple modalities of NanoString GeoMx™ Digital Spatial Profiler allow for spatially-resolved, multiplexed quantification of protein and mRNA distribution and abundance**

First author: Gokhan Demirkan, Ph.D., NanoString Technologies, Seattle, WA, USA

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract #: 146, section 6

Description: This technology validation study demonstrates the ability of GeoMx DSP to extract spatial information using 5 unique region of interest selection modalites. This enables spatial profiling of large homogeneous regions, highly interdigitated complex cellular structures, as well as small features like distinct rare cell populations.

**Title: Analysis of the immune microenvironment to advance breast cancer risk prediction and prevention**

Lead author: Doug Hinerfeld, Ph.D., NanoString Technologies, Seattle, WA, USA

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract #: 651, section 28

Description: This pilot translational study attempts to identify prognostic markers from benign breast cancer samples using standard bulk gene expression and spatial protein profiling. This study highlights the power of digital spatial profiling to profile very small features, benign lobules, distributed within a biopsy. This study revealed both intra- and inter-patient molecular phenotypic heterogeneity in lobules among benign breast cancer patients that could be prognostic.

**Title: In situ RNA expression profiling of 1600+ immuno-oncology targets in FFPE tissue using NanoString GeoMx™ Digital Spatial Profiler**

Lead author: Margaret Hoang, Ph.D., NanoString Technologies, Seattle, WA, USA

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract #: 753, section 33

Description: This study demonstrates the ultra-high-plexing capability enabled by next generation sequencing readout for digital spatial profiling. Over 1,400 RNA transcripts were profiled on FFPE tissue with a high level of precision. Moreover the unique probe design highlights the ability to resolve splice variants through spatial profiling.

**Title: Differential expression of complex immune biology in MSI and MSS colorectal tumor microenvironments using high-plex spatial resolution with clinical outcome analysis**

Lead author: Kit Fuhrman, Ph.D., NanoString Technologies, Seattle, WA, USA

Date/Time: Wednesday, April 3, 8:00am – 12:00pm ET

Abstract #: 4944, section 21

Description: This study attempts to identify novel immune markers that could be targets for immunotherapy in patients with colorectal cancer with MSS status. Standard bulk gene expression profiling and spatial RNA and protein profiling helped to characterize distinct spatial molecular phenotypes for MSS vs MSI as well as identify putative targets for immuno-therapy in MSS patients. Moreover, this study highlights the power of digital spatial profiling to spatially segment tumor microenvironments in a highly interdigitated tissue morphology.

**Selected nCounter Studies**

**Identification of gene signatures associated with response in a Phase II trial of entinostat (ENT) plus pembrolizumab (PEMBRO) in non-small cell lung cancer (NSCLC) patients whose disease has progressed on or after anti-PD-(L)1 therapy**

Lead author: Peter Ordentlich, Ph.D., Syndax Pharmaceuticals, Waltham, MA, USA

Date/Time: Sunday, March 31, 3:05pm – 3:20pm ET, Room A411 Georgia World CC

Abstract # / Section: Podium presentation: CT041, Session CTMS01 – Advances in Novel Immunotherapeutic

Description: An example of how the PanCancer IO360 Panel and Data Analysis Service can be used to identify biological gene signatures. This study focuses on response to combination immunotherapy with the HDAC inhibitor, entinostat and anti-PD1, pembrolizumab in patients with Non Small Cell Lung Cancer that have previously progressed on anti-PD1/PD-L1 monotherapy.

**Title: Gene expression signatures for the prediction of endocrine treatment outcome in early-stage luminal breast cancer patients**

Lead author: Hiltrud Brauch, Werner Schroth, Reiner Hoppe, University of Tuebingen, Stuttgart, Germany

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract # / Section: 464 / 19

Description: This study led by investigators at the Dr. Margarete Fischer-Bosch-Institute for Clinical Pharmacology aims to identify biomarkers of treatment response in a 1,200 patient early HR+ postmenopausal breast cancer cohort. The Breast Cancer 360™ Panel (BC360) was utilized to identify signatures associated with outcome when treated with tamoxifen or an aromatase inhibitor. This study highlights the ability of BC360 to identify signatures that could be used to personalize treatment selection in specific subgroups of early breast cancer patients.

**Title: Profiling Plasma cell-free RNA (cfRNA) with the NanoString Low Input nCounter Assay**

Lead Author: Chung-Ying (Alan) Huang, Ph.D., NanoString Technologies, Seattle, WA, USA

Date/Time: Sunday, March 31, 1:00pm – 5:00pm ET

Abstract # / Section: 406 / 17

Description: Circulating cell-free RNA (cfRNA) from blood is an attractive target for liquid biopsy based diagnostics because it offers the opportunity to transcriptionally characterize tumors without a tissue biopsy, but it is a challenging substrate due to low abundance and degradation. NanoString has developed a target enrichment strategy that permits characterization of cfRNA with any nCounter gene expression panel. This methodology poster benchmarks the technique against qPCR and demonstrates the ability to discriminate cfRNA from healthy donor, non-small cell lung cancer, and colorectal cancer.

**About NanoString Technologies, Inc.**

NanoString Technologies is a leading provider of life science tools for translational research and molecular diagnostic products. The company's nCounter® Analysis System is used in life sciences research and has been cited in more than 2,300 peer-reviewed publications. The nCounter Analysis System offers a cost-effective way to easily profile the expression of hundreds of genes, proteins, miRNAs, or copy number variations, simultaneously with high sensitivity and precision, facilitating a wide variety of basic research and translational medicine applications, including biomarker discovery and validation. The company's GeoMx™ Digital Spatial Profiler enables highly-multiplexed spatial profiling of RNA and protein targets in a variety of sample types, including FFPE tissue sections. The company's technology is also being used in diagnostics. The Prosigna® Breast Cancer Prognostic Gene Signature Assay together with the nCounter Dx Analysis System is FDA 510(k) cleared for use as a prognostic indicator for distant recurrence of breast cancer.

For more information, please visit www.nanostring.com.



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