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# NANOSIGHT RANGE

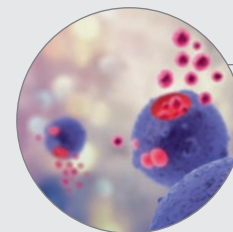
Visualize and measure particle size  
and concentration



# NTA FOR YOU

Nanoparticle Tracking Analysis (NTA) is an integral technique in the laboratory toolkit for nanoparticle characterization. By capturing the light scattered from particles undergoing Brownian motion, NTA provides particle-by-particle, high resolution particle size data, along with concentration measurements for colloidal suspensions or solutions of nanoparticles - all in a matter of minutes and with minimal sample preparation.

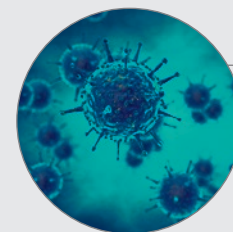
NTA is applicable to many different sample types and provides quantification of primary sample components and aggregates, or, when used with fluorescently-tagged materials, the labeled particles from any contaminants in the sample.



## EXTRACELLULAR VESICLES (EVs)

In the growing area of EV research, it is important to monitor and control the isolation and purification of material. NanoSight NTA provides quick, easy and

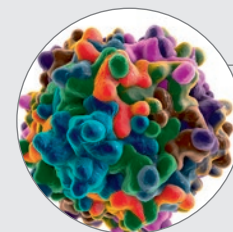
high quality characterization of the size and concentration of vesicles, whilst the use of fluorescent labeling can assist in elucidating the origin of EV subpopulations.



## VIRUSES AND VACCINES

Vaccine manufacture requires controlled production processes to ensure that materials can be appropriately dosed and recognized by the immune system.

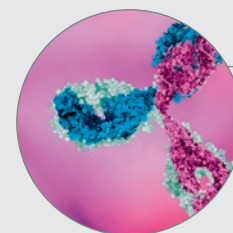
NTA assists in the optimization of vaccine manufacturing processes. As NTA is able to count and size viruses, it can be used as a faster alternative to titer-based assays.



## DRUG DELIVERY & GENE THERAPY

NTA is ideally suited for the measurement of therapeutic particles, typically sized between 70 nm and 150 nm, from early-stage research through to candidate screening, formulation development

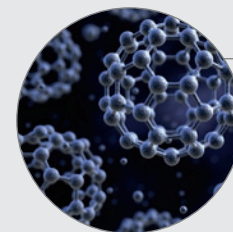
and clinical batch monitoring. NTA's concentration measurement is used for *in vitro* assays, and allows for dose determination of the final product.



## BIOTHERAPEUTICS

Temperature, pH, agitation, shear and time all impact the stability of biotherapeutic proteins, causing aggregation and denaturation, leading to loss of efficacy

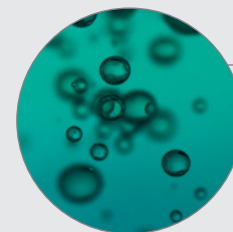
and potentially to an unwanted immune response. NTA provides high resolution size distributions of subvisible aggregates for safety and quality assurance.



## NANOMATERIALS, COLLOIDS AND NANOTOXICOLOGY

As nanomaterials are increasingly incorporated into everyday items, they are drawing the attention of regulatory bodies. NTA can provide a number-based

nanomaterial concentration, and high-resolution size distributions for those working at the nanoscale in industrial, environmental and toxicological fields.



## ULTRAFINE BUBBLES

In recent years, work on ultrafine bubbles has been gathering momentum for application in industrial cleaning and water treatment, agriculture and food, and medical applications.

NTA is ideally suited to analyze the relatively low concentration, small bubbles that are a challenge for traditional techniques.



## ACADEMIA

NTA is a key tool in the nanoparticle characterization toolkit for many academic laboratories worldwide, providing high resolution information on both monomodal

and polydisperse systems across many different material types. The global adoption of NanoSight NTA is confirmed by thousands of academic publications.



# WHY USE NANOPARTICLE TRACKING ANALYSIS?

NanoSight Nanoparticle Tracking Analysis uses particle-by-particle light scattering to provide high resolution particle size information for samples of nanoparticles. The speed, or diffusion, of nanoparticles in solution is recorded from the points of the light they scatter. Smaller nanoparticles move more quickly by Brownian motion than larger particles, and scatter less light.

NTA's sizing principle is absolute, so no calibration is required. Each particle is sized independently and measured simultaneously, enabling a deep understanding of even very complex samples. The smallest change in particle size is detected precisely, to give rapid information on events such as aggregation within the population. This accuracy and sensitivity is invaluable when considering nanoparticle batch purity and process consistency, as well as the physicochemical properties of the material, which are intrinsically linked to their size at the nanoscale.

## VISUALLY confirm presence

Collects light scattered from nanoparticles for visual confirmation and verification of results. Aggregates are easily identified within the primary population.

## TRACK each particle

Individually and simultaneously measures Brownian motion of each particle to generate particle diffusion over time.

## SIZE is easily measured

Uses the Stokes-Einstein equation to convert particle diffusion into size, providing high resolution datasets with no size bias.

# CONCENTRATION

Nanoparticle concentration is crucial for many applications, including environmental toxicology, biopharmaceutical & vaccine development and drug delivery effectiveness, and is becoming an increasingly important parameter to regulators.

NanoSight concentration measurements are obtained from a direct count of the particles in the sample, independent of instrument and user settings\*. This provides quick, reliable and highly reproducible concentration data which can be used as an indicator of efficiency, quality and batch-to-batch variability at all stages of the production process, as well as a monitor for sample stability, which helps determine a product's shelf-life and its response to stressors.

## MEASURE by counting

Each particle light scattering point is identified by the software for inclusion within the dataset.

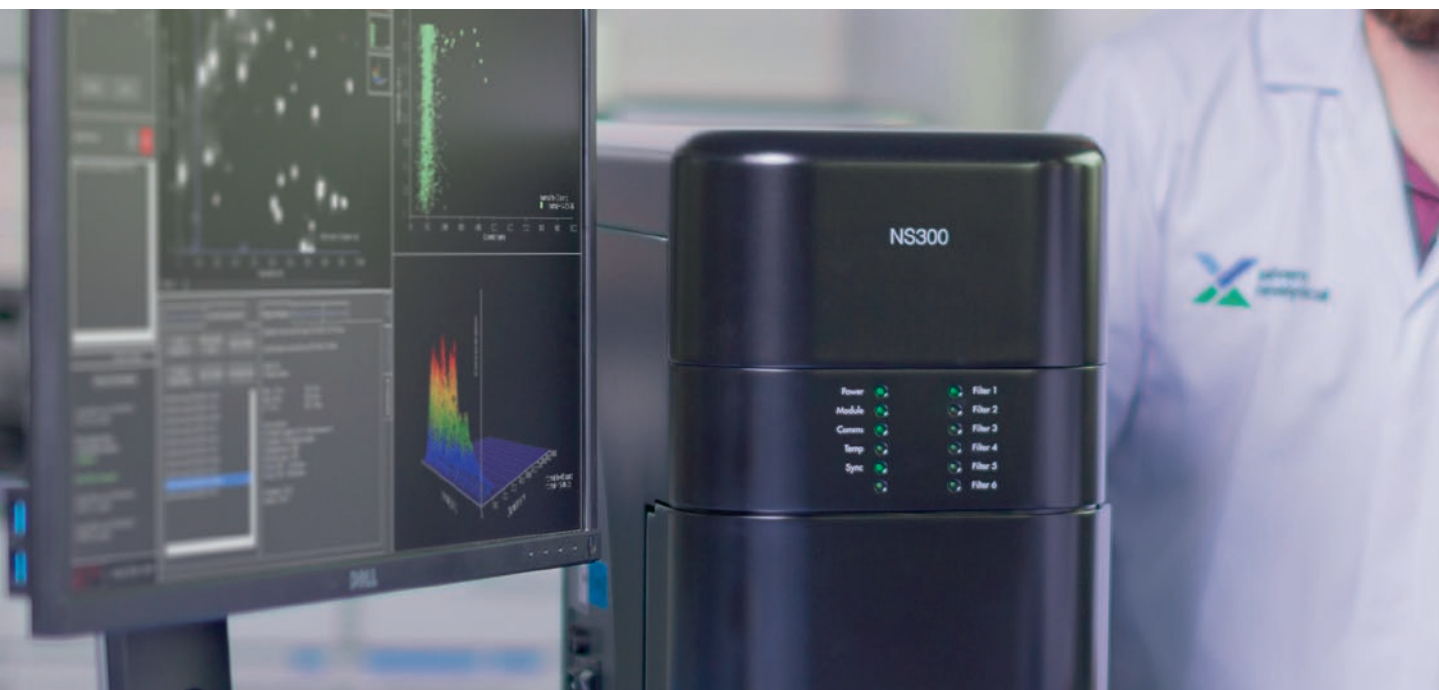
## PARTICLE in a volume

Measurement volume is dynamically and automatically adjusted.\*

## CONCENTRATION that's reproducible

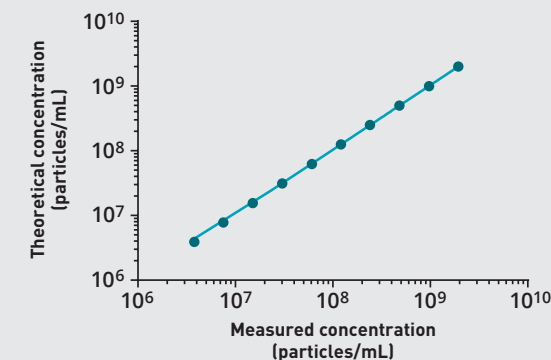
Smart algorithms provide high precision data. Reproducible from user-to-user and lab-to-lab\*.

\*dependent on system configuration



## CONCENTRATION LINEARITY

Concentration values are linear over a wide range of sample dilutions and show excellent alignment with calculated concentration values. Example data obtained on NS300 using NIST-traceable 150 nm latex particles.





## NANOSIGHT NS300

### Assured & visual

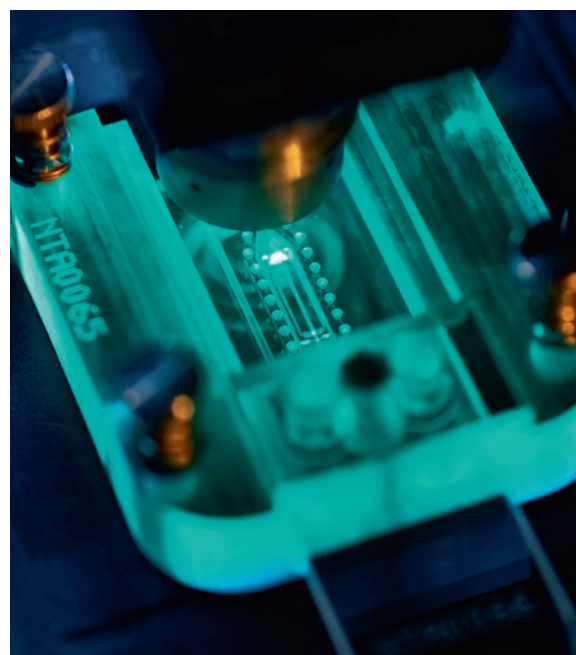
Advanced performance for particle size, concentration and size distribution analysis. Over 1000 particles can be measured in just 60 seconds, and direct visual validation of particle tracking and results gives extra confidence.

### User-friendly

The NTA software suite provides simple set-up for Standard Operating Procedure control of measurements for the new user, while allowing powerful flexibility for the expert user. Image set-up is automatic for a wide range of materials, and data are obtained in minutes.

### Fluorescence detection

When more insight into your sample is required, appropriate labeling methods may be used. Suitably-labeled subpopulations can be identified by the presence of surface markers, internal cargo, or to discriminate between primary material and any contaminants.



*"The NanoSight NS300 system is easier to focus as there is no need to find the fingerprint region anymore, since it is pre-set. The instrument and interface are both easier to use and more user-friendly."*

**Sophie Briffa and Laura Ellis**

Earth and Environmental Sciences,  
University of Birmingham, UK.

## NANOSIGHT NS300 KEY FEATURES AND BENEFITS

- Nanoparticle Tracking Analysis (NTA) technology visualizes and measures particle size from 10 nm to 1  $\mu\text{m}^*$
- Simultaneous particle-by-particle analysis provides high resolution size distribution and number concentration data for samples up to  $1 \times 10^9$  particles/mL
- Choice of up to 4 laser wavelengths permits use with a wide range of materials and fluorophores
- Optional software-controlled filter wheel for up to 5 filters provides flexible fluorescence detection capability
- Integrated temperature readout for measurement at ambient, or controlled sample temperatures up to 50°C
- NTA software and sample chambers support the use of Flow Mode for improved sampling statistics
- Measurement in minutes with minimal sample preparation, requiring no costly consumables
- Compatible with NanoSight Sample Assistant autosampler to support walk-away measurements, freeing up valuable operator time, especially when measuring larger sample sets
- Low-volume flow cell provides data from as little as 250  $\mu\text{L}$  of sample, while a larger volume, chemically-compatible sample chamber option supports a wide range of material types and applications
- Data are available as PDF summary reports, along with .csv formats for both individual particle data and summaries
- Complies with Industry Standards ISO 19430:2016 and ASTM E 2834:2012 for data quality assurance; optional 21 CFR Part 11 software features

\*dependent on sample and system configuration

# NANOSIGHT SAMPLE ASSISTANT

When operator time is at a premium and sample numbers are high, you can be assured of high quality NTA data by linking the NS300 to the NanoSight Sample Assistant autosampler accessory.

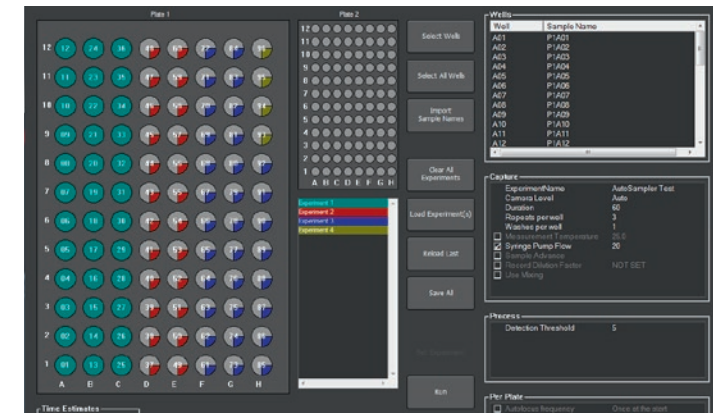
The Sample Assistant is a versatile and compact system that enables precise, reproducible and automated loading of samples from a 96-well plate. Boasting unattended operation post-initialization, the Sample Assistant both improves the accuracy and repeatability of your measurement and also maximizes the productivity of your NTA system.



“The NanoSight system is easy to use, well-designed, and delivered valuable project data immediately upon installation. The automated sampling and analysis capabilities of the Sample Assistant is of particular value to us during screening and product development.”

**Sven Evan Borgos**  
Senior Research Scientist,  
Department of Biotechnology  
and Nanomedicine, Sintef AS.

The bespoke NTA software interface provides guided workflows for system set-up in under 30 minutes, and offers all the method flexibility you expect from NanoSight.

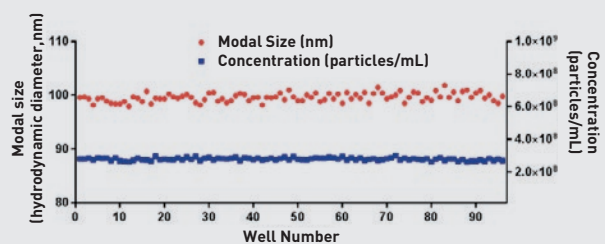


## NANOSIGHT SAMPLE ASSISTANT KEY FEATURES AND BENEFITS

- Provides automated sample loading for up to 96 samples from a standard footprint, 2 mL well plate
- Provides unattended NTA measurements, even overnight
- Up to 10-fold acceleration of NTA data generation
- Removes operator bias, improving reproducibility
- Integrated cleaning protocols ensure <0.1% carryover
- Intuitive method development for data collection, analysis and export
- Supports the use of measurements under flow conditions for improved sampling and repeatability
- Bespoke software with user-friendly interface for both set-up and shut-down

## EFFICIENCY MAXIMIZED

Unattended, automated analysis of a full 96-well plate in around 15 hours with no compromise on data quality.

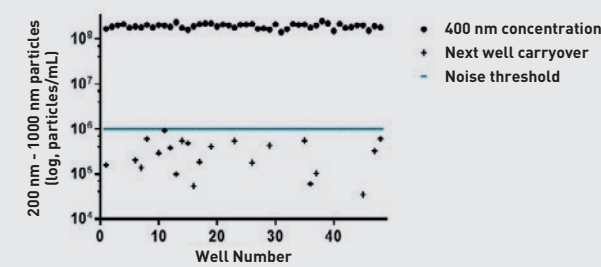


% Coefficient of variation	Modal size (nm)	Concentration (particles/mL)
Expert user (manual loading)	1.24	1.24
Sample Assistant	1.24	1.24

Nanoparticle size and concentration for 96 samples of 100 nm latex beads, loaded by NanoSight Sample Assistant and measured in flow mode.

## CONTAMINATION MINIMIZED

Integrated automated cleaning regimes eliminate the risk of sample carryover.



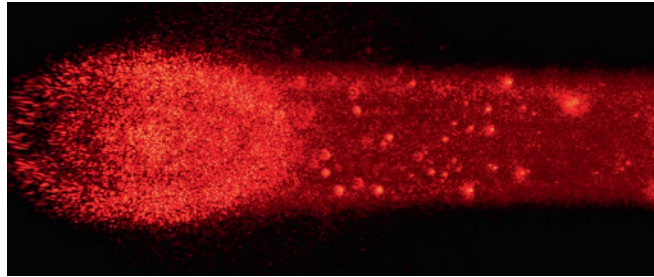
Particles >200 nm measured using a NanoSight NS300 with Sample Assistant, detected in particle-free water wells positioned subsequently to wells containing 400 nm polystyrene standards. There was an average carryover of 2 particles per 10 frames of video captured by NTA software – well below the standard noise threshold.

NanoSight Sample Assistant specifications	
Sample capacity	96 max (1 x standard footprint, 96-well 2 mL plate)
Required sample volume per sample	1000 µL
Cross contamination	<0.1%
System set-up time	Less than 30 minutes for 96 samples
Sample measurement time	Less than 10 minutes per sample for a triplicate 60 second measurement, including cleaning and data analysis and export



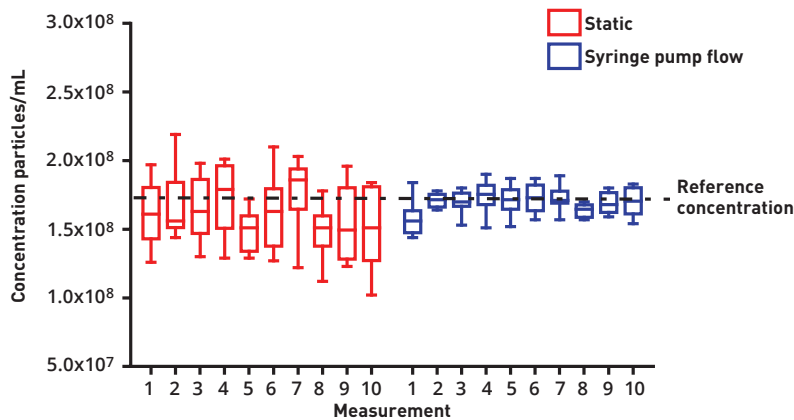
# NANOSIGHT LM10

The NanoSight LM10 is a manual, entry-level instrument that provides NTA data for both routine testing and research laboratories. It comes with a choice of lasers and optional fluorescence filters, as well as the option of a temperature-controlled sample chamber.



# NANOSIGHT SYRINGE PUMP

The NanoSight Syringe Pump accessory is compatible with all NanoSight instruments. It provides a continuous flow of new particles into the sample chamber when operating in Fluorescence Mode, removing particles that have experienced photobleaching. When used in Light Scatter mode, data are more robust, due to improved sampling statistics.



# SPECIFICATIONS

	NS300	LM10
Technology	Nanoparticle Tracking Analysis	
Size range (diameter) <sup>1</sup>	10 nm – 1000 nm	
Particle concentration <sup>2</sup>	10 <sup>6</sup> – 10 <sup>9</sup> particles/mL	
Advanced Concentration Algorithm	Concentration Upgrade	N/A
Minimum sample volume	250 µL	500 µL or 750 µL <sup>3</sup>

### SYSTEM

Product compliance	Product laser class 1 (IEC/EN60825-1), EMC Directive: 2014/30/EU (EN 61326-1: 2013), Low Voltage Directive: 2014/35/EU (EN 61010-1: 2010), RoHS Directive: 2011/65/EU (EN50581:2012)	
Camera – High sensitivity sCMOS	USB-3	IEEE 1394b Firewire
Camera – Standard CCD	N/A	IEEE 1394a Firewire
Laser information - Beam wavelength (maximum power output)	405 nm (55 mW) 488 nm (45 mW) 532 nm (50 mW) 642 nm (40 mW)	
Temperature control range	5°C below ambient up to 50°C	Ambient only; Optional 5°C below ambient up to 50°C
Temperature readout	Automatic	Manual; optional automatic
Dimensions (H * W * D)	40 cm * 25 cm * 40 cm	42 cm * 20 cm * 26 cm
Weight of instrument	12 kg	7 kg
Weight of laser module	0.65 kg	0.36 kg or 0.65 kg <sup>3</sup>
Power requirements	AC 110 – 240 V, 50-60Hz, 4.0A	
Ambient operating conditions	Up to 80% rH at 31°C then decreasing linearly to 50% at 40°C	

### ADDITIONAL OPTIONS

Sample Assistant Autosampler	For unattended delivery of up to 96 samples	N/A
Fluorescence – manual filter selection <sup>4</sup>	N/A	For up to 2 filters
Fluorescence – automatic selection <sup>4</sup>	For up to 5 filters	N/A
Syringe pump	Continuous sample flow with 1 mL syringes	

#### Notes:

1 Dependent on sample and instrument configuration

2 Sample dependent. At 10<sup>6</sup> particles/mL, sampling statistics require run times of several minutes

3 Dependent on laser module type

4 Optional functionality. Long-pass filters available for each laser wavelength as standard; specific band-pass filters available upon request



## WHY CHOOSE MALVERN PANALYTICAL?

We are global leaders in materials characterization, creating superior, customer-focused solutions and services which supply tangible economic impact through chemical, physical and structural analysis.

Our aim is to help you develop better quality products and get them to market faster. Our solutions support excellence in research, and help maximize productivity and process efficiency.

Malvern Panalytical is part of Spectris, the productivity-enhancing instrumentation and controls company.

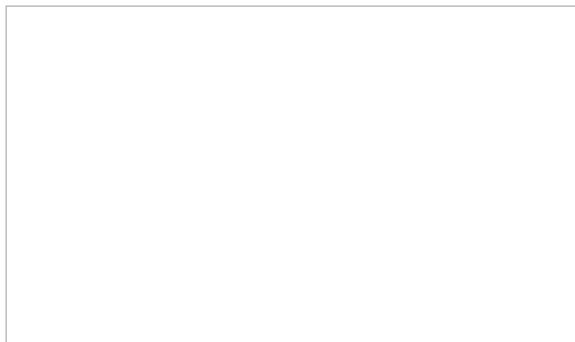
[www.spectris.com](http://www.spectris.com)

## SERVICE & SUPPORT

Malvern Panalytical provides the global training, service and support you need to continuously drive your analytical processes at the highest level. We help you increase the return on your investment with us, and ensure that as your laboratory and analytical needs grow, we are there to support you.

Our worldwide team of specialists adds value to your business processes by ensuring applications expertise, rapid response and maximum instrument uptime.

- Local and remote support
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- Compliance and validation support
- Onsite or classroom-based training courses
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- Sample and application consultancy



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