

FORCES IN BIOLOGY

PAVONE





MECHANOBIOLOGICAL SCREENING
IN 96-WELL PLATES

MICROMECHANICS OF
CELLS AND TISSUES

INTEGRATE
INDENTATION,
IMAGING &
INCUBATION



DESIGNED FOR
BIOSAMPLES

MECHANICAL SCREENING

Are you interested in the mechanical behaviour of biosamples?
Do you want to correlate functional with structural properties?

The Optics11 Pavone enables researchers to analyze structural and functional properties of cells and other biosamples simultaneously in a controlled environment by integrating nanoindentation, modular imaging and incubation. Compatible with 2 x 96-well plates, the Pavone allows for the screening of functional properties, including cell stiffness, viscosity, adhesion, contraction, mechanosensing, and structural properties including phase-contrast, fluorescence or confocal microscopy.

The Pavone is purposely built to combine different microscopy modes with high-precision, non-destructive force sensing. Our direct measurement technique allows to manipulate and measure even the smallest physical events on single cells or tissues.





APPLICATIONS

The Pavone allows you to characterize many mechanical parameters of almost any sample, including living cells, spheroids, organoids, hydrogels, engineered tissues, tissue explants or microsections, and many more.

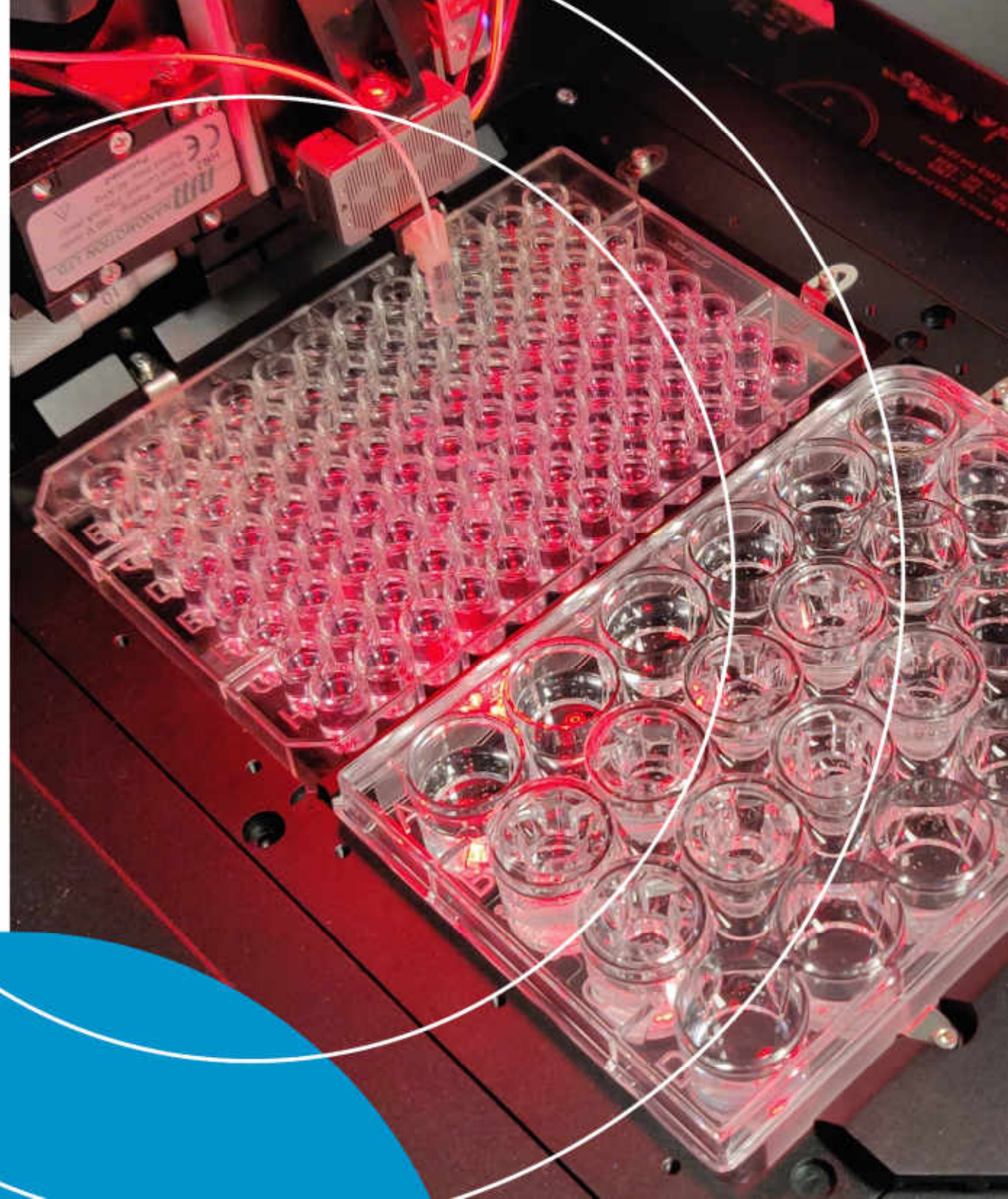
Application examples include

- Single-cell pathology: studying the relationship between mechanics and genomics in disease, such as cancer or fibrosis.
- Single-cell mechano-pharmacology: studying the function of cell mechanics in disease and its relation to possible pharmaceutical targets.
- Single-cell physiology: studying the role of force-function relationships in living cells, such as myocyte contractility or stem cell lineage or division.

Ask us if we can accommodate your specific application needs!

PERFORM
QUANTITATIVE
MECHANOBIOLOGY
RESEARCH

ELICIT STRUCTURE-
FUNCTION
RELATIONS IN CELLS
AND TISSUES





TECHNOLOGY

The Pavone combines state-of-the-art fiber-optical force sensing technology with cleverly designed imaging and incubation solutions to provide a true one-stop solution for any mechanobiological analysis challenge.

The fiber-optical interferometric MEMS technology developed by Optics11 makes it possible to measure even the softest materials with high force resolution in a non-destructive way, also while immersed in liquids. The unique patented force sensors are made of glass, easy to install and re-usable.

The modular imaging is purposely developed for mechanobiologists that want to unravel structure-function relationships. Hence the Pavone is compatible with all sorts of microscopy modes including bright-field, phase-contrast, fluorescence and confocal microscopy. With up to three optical ports different modes can be set-up simultaneously.

Finally the Pavone offers options for environmental control, such as temperature, humidity and CO₂ regulation.

PAVONE INSTRUMENT FEATURES

- Small footprint benchtop instrument (68 x 60 CM)
- Compatible with dishes and well plates (up to 2 x 96-wells)
- Pre-calibrated re-usable indentation probes
- Fully customizable indentation profile and sequence
- Click-and-go interface
- Interchangeable objective and filter cubes
- Three optical ports for maximum compatibility
- Standard bright-field and phase-contrast included
- Upgradable to fluorescence and confocal microscopy
- Temperature control (optional humidity & CO2 control)



TECHNICAL SPECIFICATIONS

Indentation capabilities

Force range	20 pN – 2 mN
Young's Modulus range	1 Pa up to 1 GPa
Tip size & geometry	1 up to 100 μ m diameter, spherical
Max. indentation stroke	100 μ m
Modes of operation	Displacement, force, indentation and DMA-mode
Frequency range	0.1 up to 100 Hz
Practical noise level	1 nm
Probe material	Glass

Imaging capabilities

Objective	Up to 60x (interchangeable)
Motorized Z-travel	21 mm @ 5 nm resolution
Image stacking capability	Yes
Optical ports	3 (2 C-mount, 1 source)

System parameters

Environmental control
Temperature range
Coarse X-Y stage travel
Coarse Z stage travel
Fine Z-stage travel
Indentation speed
Maintenance

Temperature, humidity, CO₂
Ambient up to 40°C
120 x 190 mm @ 50 nm resolution
25 mm @ 2,5 nm resolution
100 µm @ 0,5 nm resolution
Up to 500 points / hour
Annual checks

Software

Experimental design
Data format
Data analysis

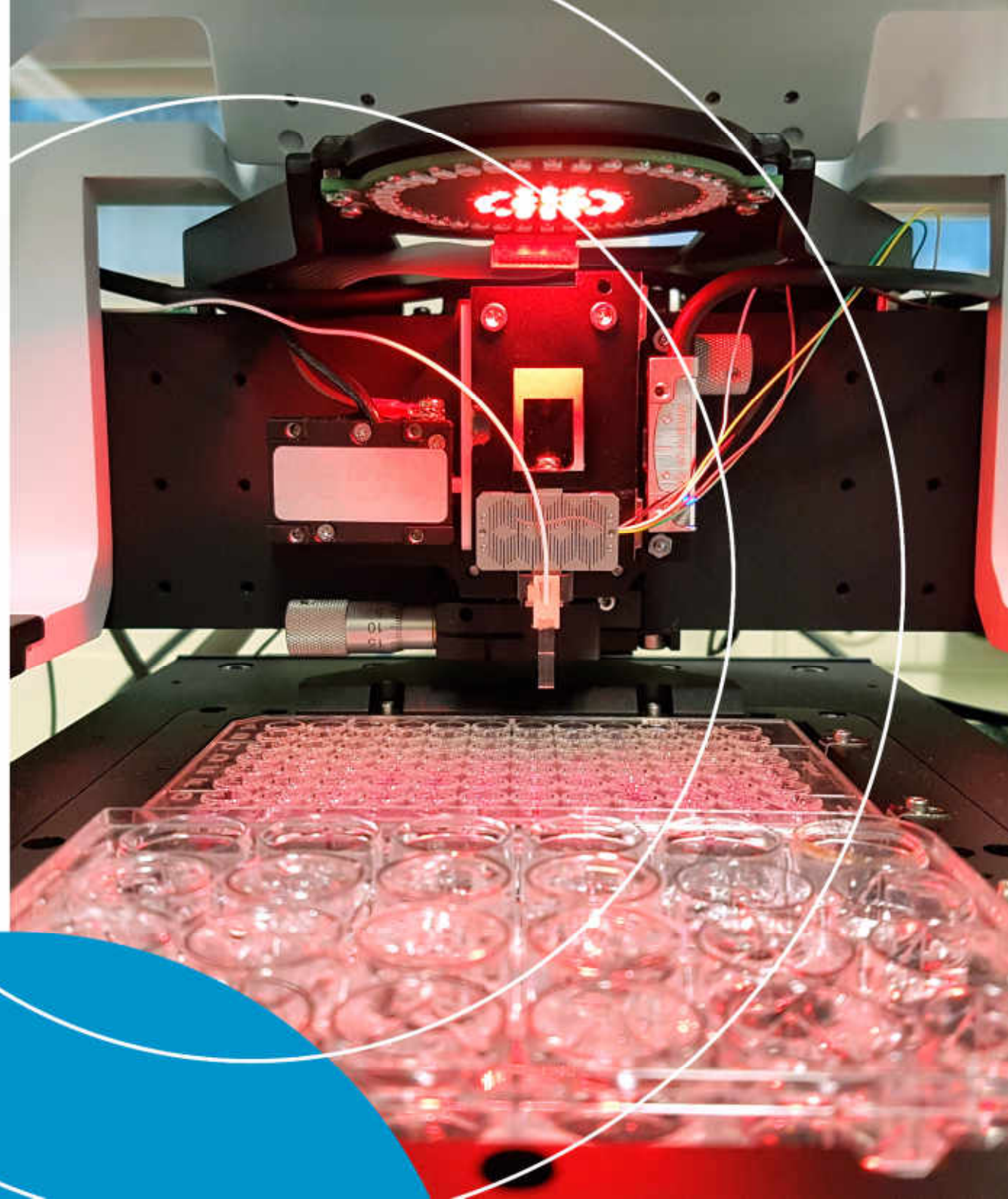
Modular, fully customizable
.csv /.tiff
Dataviewer program

Options

Imaging
Environmental control

Fluorescence (2 ch.), confocal (2 ch.)
Humidity, CO₂

ENABLING
GROUNDBREAKING
RESEARCH WITH
CUTTING-EDGE
TECHNOLOGY





ABOUT OPTICS11

Optics11 is a fast-growing high-tech company that offers state-of-the-art fiber-optical measurement sensors which are integrated in complete measurement solutions. Our instruments find applications in the life-science field, from fundamental biophysics to applied pre-clinical research.

We love making cutting-edge technology fit for use!

Our mission is to apply state-of-the-art technology to develop high-performance yet cost-effective instruments that advance science worldwide.

Please contact us at info@optics11.com for more information, technical data sheets, or to speak with a representative about your specific needs.





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