

FORCES IN BIOLOGY

CHIARO NANOINDENTER





MEASURE & APPLY FORCES
ON BIOLOGICAL SAMPLES

PICO-NEWTON FORCE
RESOLUTION

EXPLORE
MECHANICS
OF CELLS AND
SOFT SAMPLES

MICRO-SCALE
CONTACT AREA

DESIGNED FOR CELLS AND MICROMATERIALS

Are you curious about the mechanical behaviour of cells, spheroids or other small objects? Do you work with soft or biological materials that are challenging to characterize?

The Optics11 Chiaro Nanoindenter is purposely built to enable researchers to apply and measure forces on small objects while placed on an inverted microscope. To assess living samples the Chiaro can measure samples in near physiological conditions.







The Chiaro is designed as a compact yet powerful device compatible with almost any inverted microscope. You can now start to explore force-biology relations in your own lab!





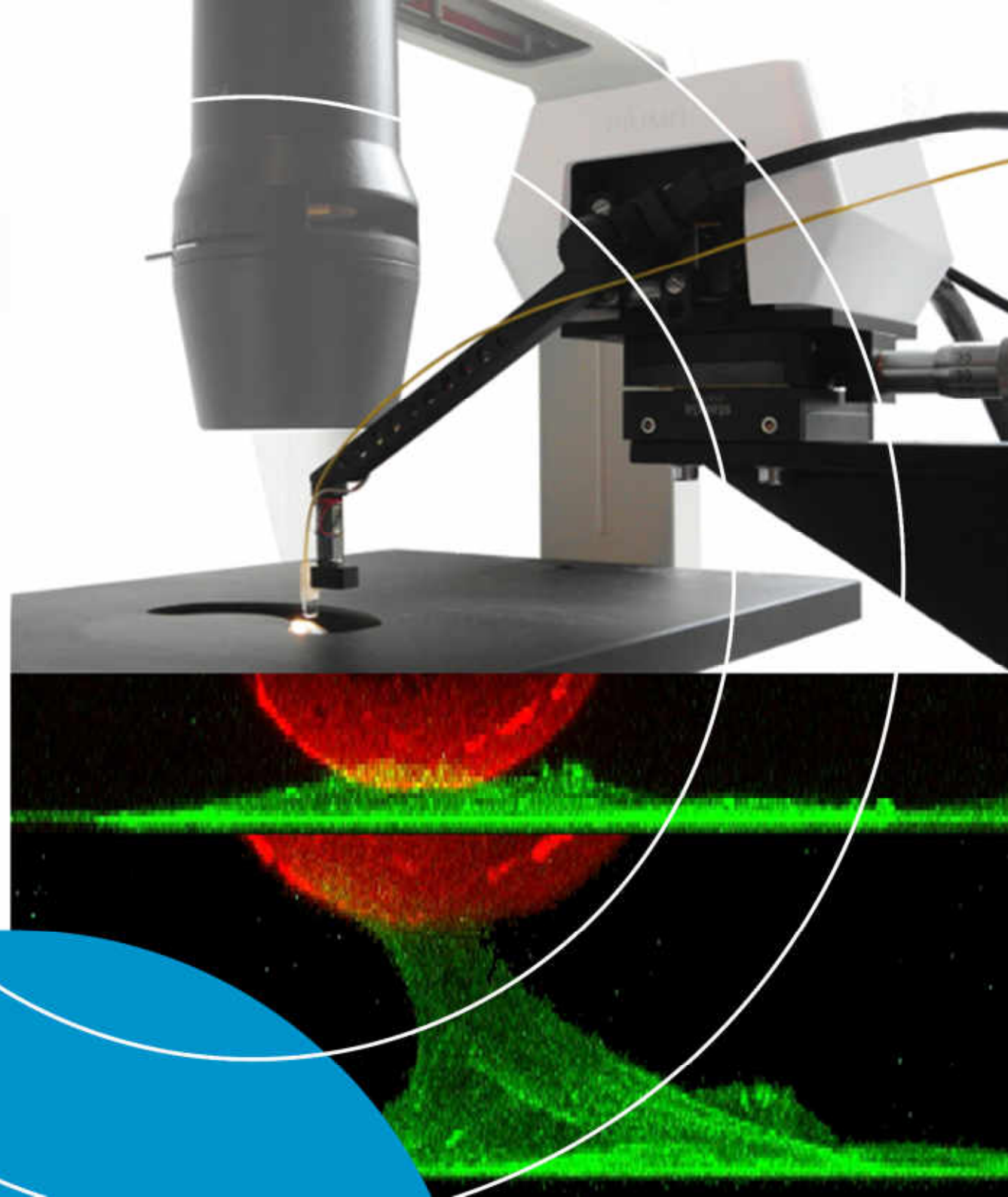
APPLICATIONS

Apply & measure forces on:

-  Isolated cells
-  Cell layers and sheets
-  Cells on micropatterns or pillars
-  Microparticles/capsules/droplets
-  Histology sections
-  3D printed microstructures

Ask us if we can accommodate your application needs!

EXPLORE THE
MECHANICS OF
CELLS AND
MICROMATERIALS



UNIQUE
PATENTED
TECHNOLOGY

TECHNOLOGY

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 manner, even **while immersed in liquids**. Our unique and patented force sensors are **easy to use** and **re-usable**.

The Chiaro instrument is designed for use in **biology labs**, where a need for **usability, throughput** and **reliable results** meet **complex soft samples** and **challenging measurement conditions**. The Chiaro meet these challenges and provide results that help you better understand the mechanical behaviour of your materials.

The Chiaro can analyse mechanics of **any sample type or shape**: from sub-micron films or cells to intact cell sheets or 3D-printed microstructures. **Measuring in liquid** allows for measuring **in-vivo-like conditions**, or place the Chiaro in a microscope enclosure ensure sample survival when performing studies over longer time spans.



INSTRUMENT FEATURES

Being mounted independently, the Chiaro can be combined with almost any inverted microscope, from standard bright-field, fluorescence and confocal to home-built microscopes!

Key features of the Chiaro include:

- Match with any inverted microscope
- Easy to learn and master
- Pre-calibrated probes
- Apply & measure extremely low forces
- Direct data & result output
- Customizable displacement/load/indentation profiles
- Micro-DMA (dynamic mechanical analysis) capability
- Automatic find-surface function
- Small footprint
- Little to no maintenance required
- Low-cost, high performance

TECHNICAL SPECIFICATIONS

Probe

Stiffness range	0.02 N/m up to 100 N/m
Force range	20 pN – 2 mN
Practical noise level	1 nm
Young's modulus range	1 Pa up to 1 GPa
Probe material	Glass

System

Indenter dimensions	120 x 150 x 280 (mm, WxLxH)
Modes of operation	Displacement, Load, Indentation
Dynamic frequency range	0.1 – 10 Hz
Displacement stroke	20 μm / 100 μm
Lateral scan range	12 x 12 mm
Minimum lateral pitch	<1 μm
Output signal bandwidth	20 kHz (linear)

Software

Data acquisition rate
In-software analysis models

Raw data format
Displ./load/indentation profile
Calibration

1 Hz – 16 kHz
Young's Modulus (E)
Storage / Loss Modulus (E' / E'')
Tan-delta
.CSV, .BMP
Fully customizable
Automatic / Pre-calibrated

Options

Dynamic module
Inverted camera module
Temperature control

Load, indentation & DMA control
10X inverted or side-view camera
Ambient – 60°C

Maintenance

Probe

System

Demi-water
Iso-Propylalcohol (IPA)
Other common solvents
Annual checks

ENABLING
GROUNDBREAKING
RESEARCH WITH
CUTTING-EDGE
TECHNOLOGY





ABOUT OPTICS11

Optics11 is a fast-growing high-tech company that offers revolutionary new optical fiber measurement systems. Our measurement systems find applications in many fields, from life science research to industrial process monitoring.

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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