CHIARO instrument

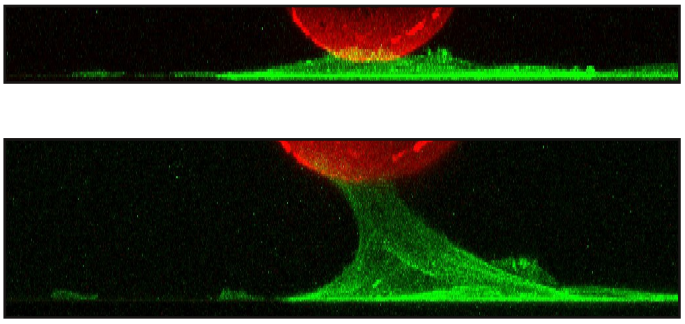
Enabling cell mechanobiology and biophysics

- **Apply and measure pN-range forces on any attached cell, also while immersed in liquids**
- **Combine advanced force experiments with any inverted microscope**
- **Measure adhesion, elasticity, viscosity in one single experiment**

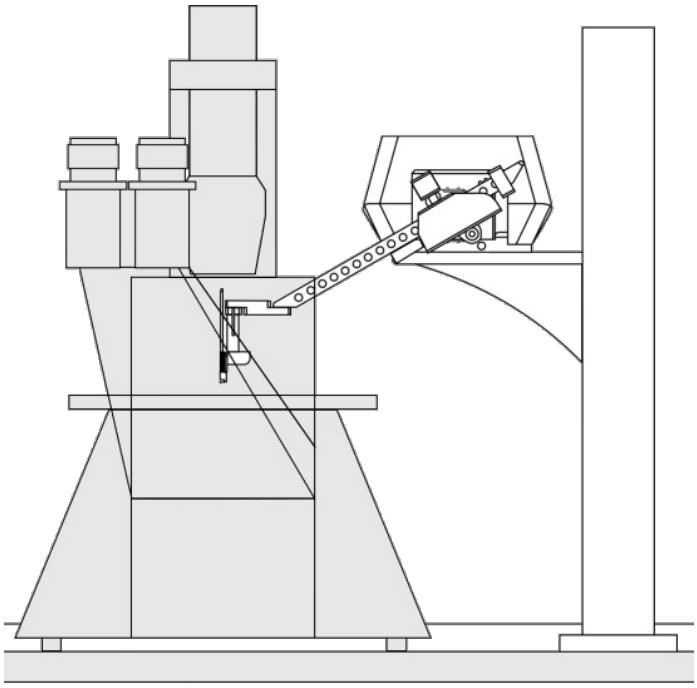
The Chiaro Nanoindenter is engineered to enable researchers that work with **cells, spheroids, microtissues and other soft and small samples** with an **accurate and easy** way to **non-destructively** measure the **local mechanical properties** of any sample.

Amongst the many applications possible, the Chiaro Nanoindenter is used to examine the local mechanical properties of (stem)cells, microparticles and capsules, microtissues, hydrogels, tissue-engineered constructs, cell spheroids, plant and tissue sections and many more. Also the Chiaro is very suited to perform complex force measurements on cells and small samples, such as ion channel activation, cell-protein binding, cell-cell adhesion, cell visco-elastic response and many more.

- **Measure extremely soft or delicate materials**
- **Tip size 5 µm up to 500 µm in diameter**
- **Measure samples while immersed in liquids**
- **Automated mapping up to 12 x 12 mm**
- **Plug-and-play precalibrated probes**
- **Single ramp or oscillatory measurements**



Cell adhesion force experiment. Image Courtesy of Dr. rer. nat. Petersen, Cellular Biomechanics, Julius Wolff Institute for Biomechanics and Musculoskeletal Regeneration, Charité, Berlin.



Combination of the Chiaro instrument with an inverted microscope. The independent mounting on a table or surface makes the Chiaro compatible with almost any microscope.

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Specifications Chiaro Nanoindenter		
	Standard version	**Dynamic version**
Maximum displacement	20 µm / 100 µm*	20 µm / 100 µm*
Min. force resolution	0.02 nN	0.02 nN
Sample stage range	12 x 12 mm	12 x 12 mm
Minimum lateral pitch	< 1 µm	< 1 µm
Grid mapping speed	Up to 1 point / s	Up to 1 point / s
Young's Modulus range	5 Pa up to 1 GPa	5 Pa up to 1 GPa
Oscillatory frequency range	-	0.1 - 10 Hz
Modes**	D	D, P, I
In-suite models	O&P, Hertzian	O&P, Hertzian, DMA analysis
In-suite modelling parameters	E	E, E', E" (G', G")
Data output	Tab separated text file	Tab separated text file

* Optional

**Modes:

D:	**Displacement mode**	**Controlling piezo (probe) displacement**
P:	**Load control mode**	**Controlling load applied to sample**
I:	**Indentation control mode**	**Controlling indentation depth in sample**

The probes are made of glass and reusable. Probes can be cleaned using demineralized water or isopropylalcohol, using enzymatic solutions or plasma cleaning. Indentation probes are supplied pre-calibrated and plug-and-play: just plug in the probe and click the start button!

The following options are available for the Chiaro Nanoindenter:
100 micron stroke upgrade, mounting materials for stand-alone operation, indenter arm extension piece for low condensor-crosstable clearance, a breadboard to support the microscope and the Chiaro assembly and microscope supports to fix the microscope to the surface.

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