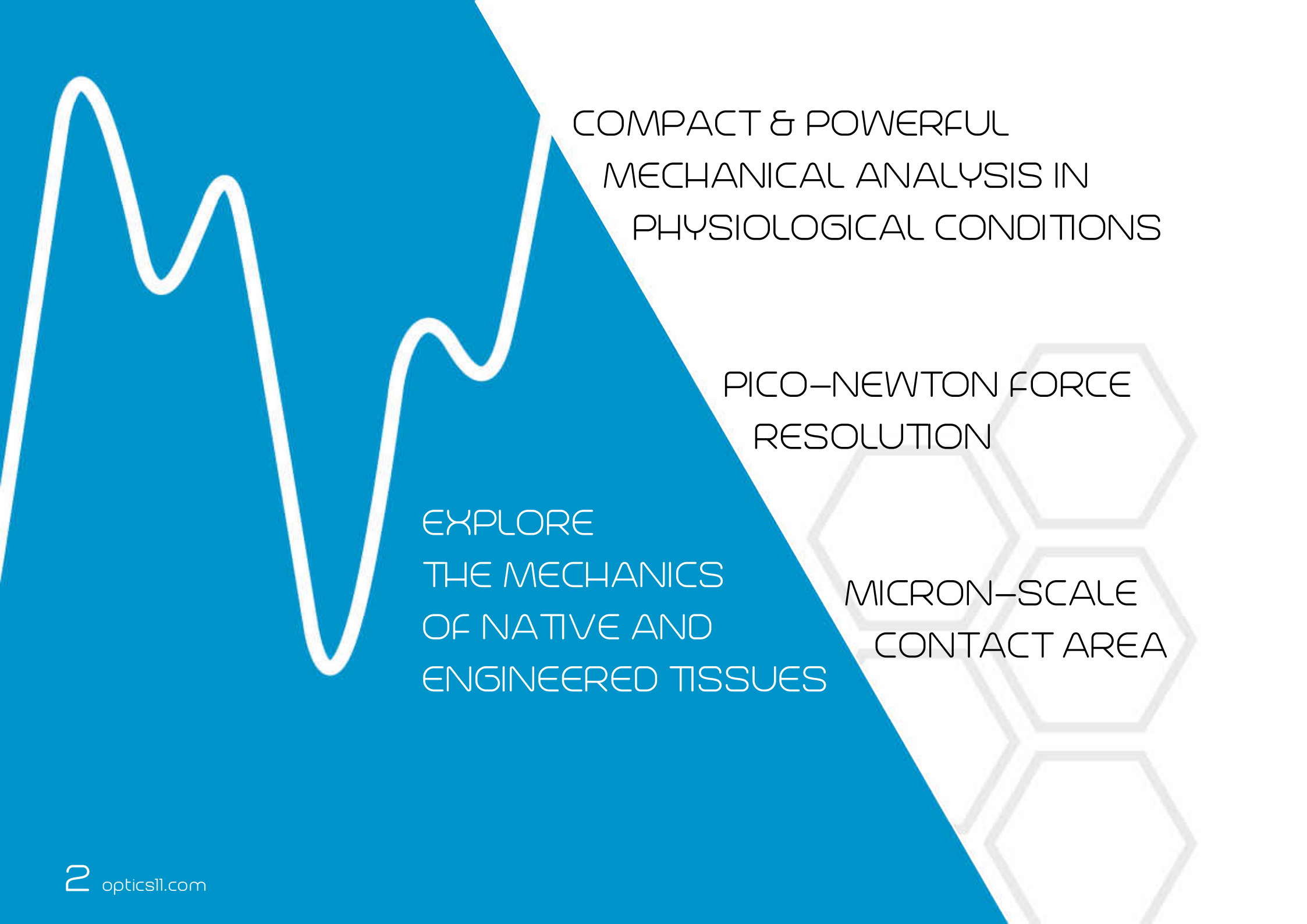


FORCES IN BIOLOGY

PIUMA NANOINDENTER





COMPACT & POWERFUL
MECHANICAL ANALYSIS IN
PHYSIOLOGICAL CONDITIONS

PICO-NEWTON FORCE
RESOLUTION

EXPLORE
THE MECHANICS
OF NATIVE AND
ENGINEERED TISSUES

MICRON-SCALE
CONTACT AREA

DESIGNED FOR TISSUES AND HYDROGELS

Are you curious about the mechanical behaviour of soft and complex materials? Do you work with soft or biological materials that are challenging to characterize?

The Optics11 Piuma Nanoindenter is purposely built to explore soft materials down to cell-length scales in physiological conditions, providing true insights in the mechanics of native and engineered materials and the (engineered) cell niche.

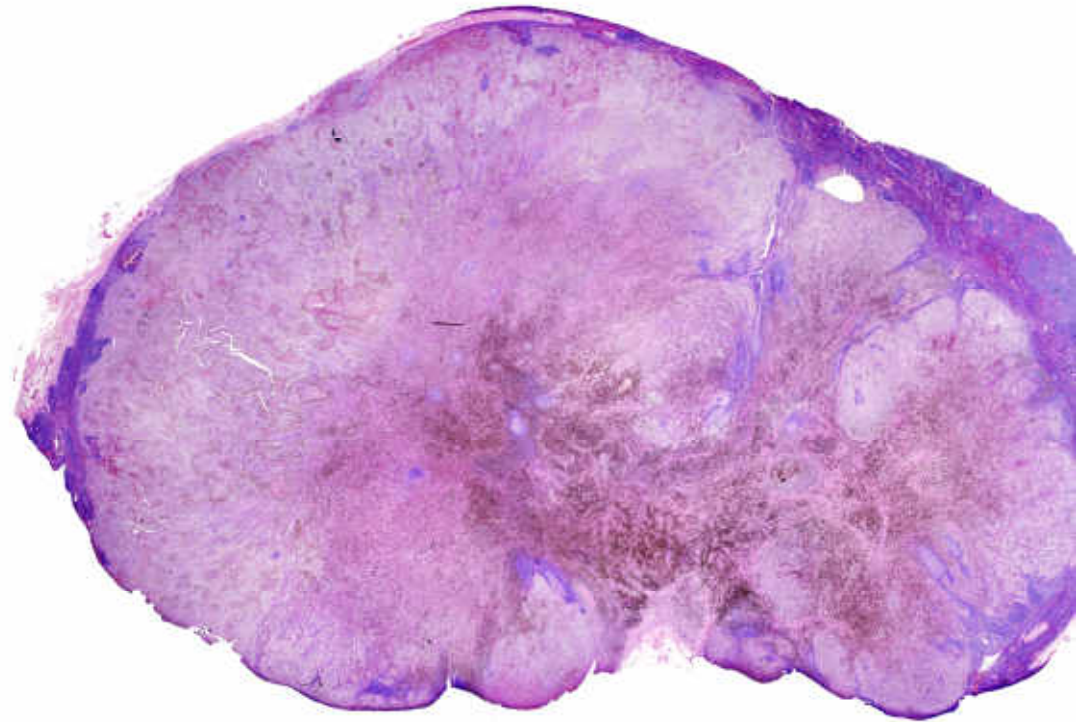
The Piuma is designed as a compact yet powerful stand-alone device for use in any lab. You can now start to explore the micro-mechanical design of biological and engineered samples in your own lab!



APPLICATIONS

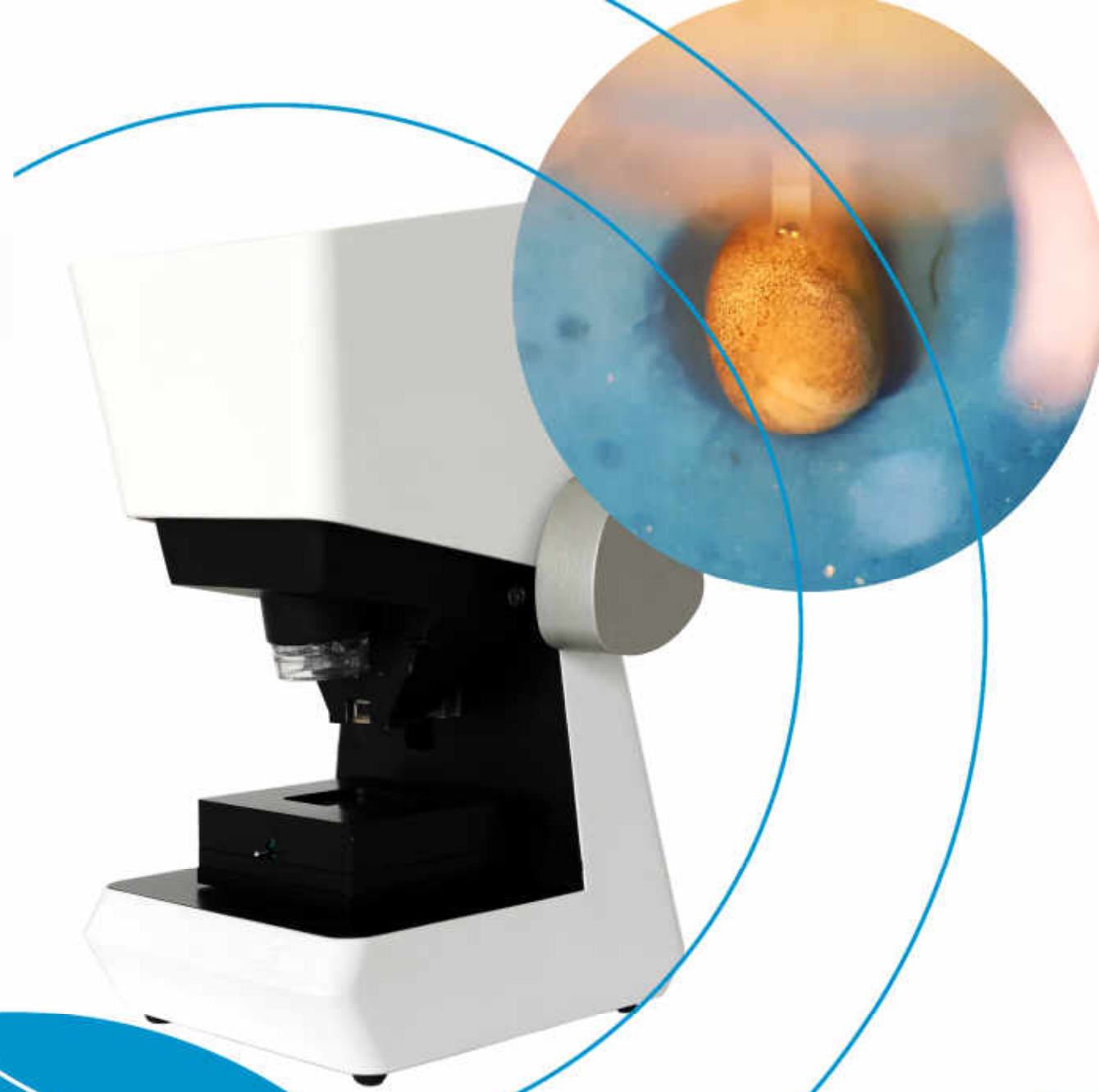
Characterize mechanical properties of:

- Biological tissues
- Engineered tissues
- Spheroids
- Cell scaffolds
- Hydrogels
- 3D printed biomaterials
- Particles/capsules



Ask us if we can accommodate your application needs!

EXPLORE THE
MECHANICS OF
SOFT (BIO)-
MATERIALS



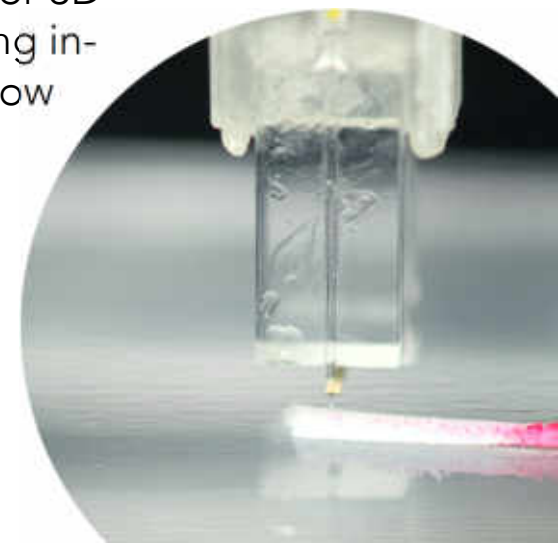
UNIQUE
PATENTED
TECHNOLOGY

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** way, also while **immersed in liquids**. The unique and patented force sensors are **easy to use** and **re-usable**.

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

The Piuma is designed to be compatible with almost any sample type or shape: from sub-micron films or cell sheets to intact tissue constructs or 3D-printed cell scaffolds. Adding **temperature control** allows for measuring in-vivo-like conditions or place the Piuma indenter head in the laminar flow cabinet to ensure **sample sterility**.



INSTRUMENT FEATURES

With a modest 12 x 15 cm footprint, the Piuma will fit on any benchtop. Due to the fiber-optical technology there are little requirements for installation: any benchtop surface works!

Key features of the Piuma include:

- Install on any bench or tabletop surface
- Easy to learn and master
- Pre-calibrated probes
- Reliably measure even the softest samples
- 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 μ m
Lateral scan range	12 x 12 mm
Minimum lateral pitch	<1 μ m
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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