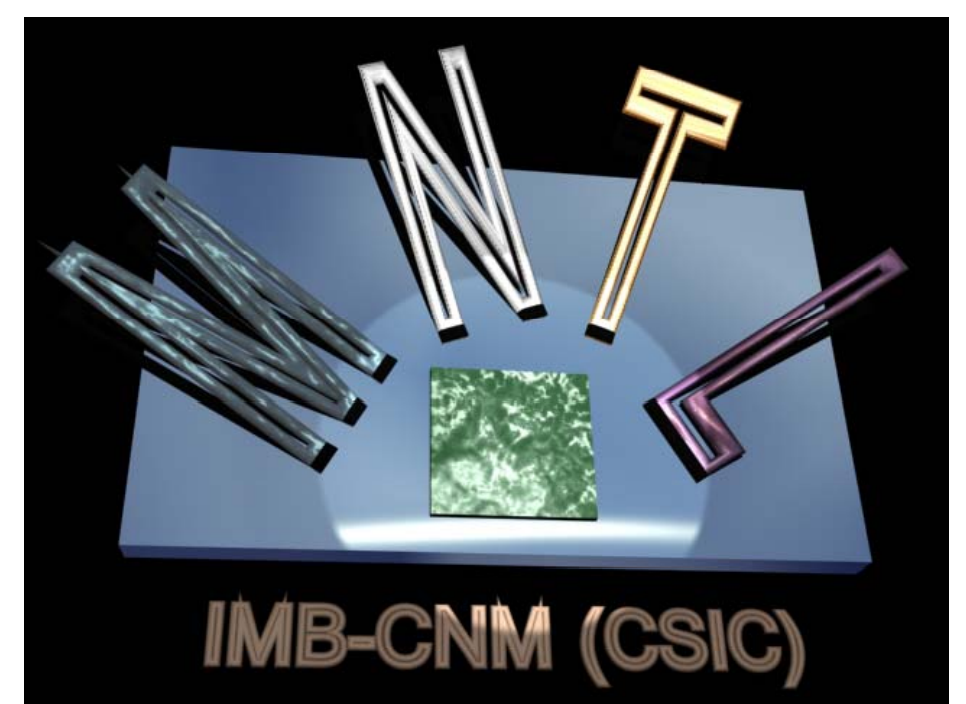


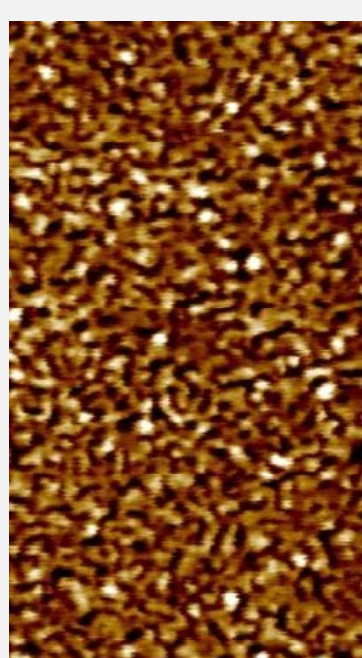
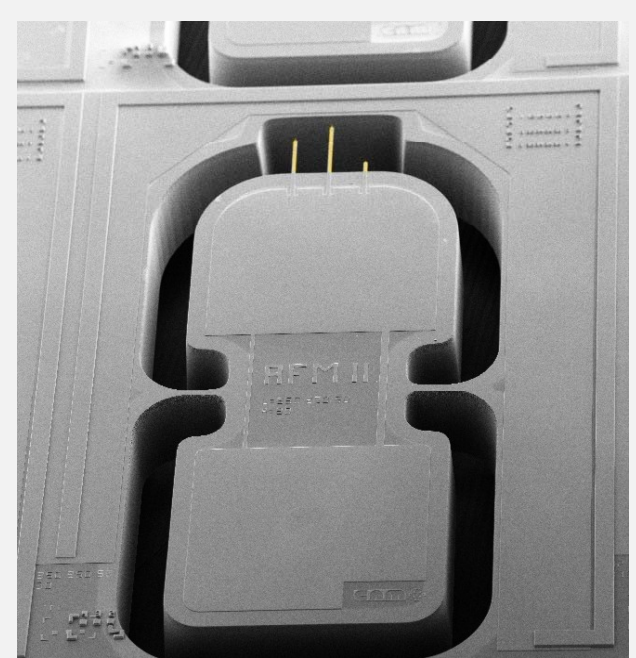
MICRO AND NANOTOOLS



Research interests

The Micro and Nanotools group is multidisciplinary group composed of physicists, engineers and chemists, which stimulates us to do research in different areas of knowledge by collaborations with national and international complementary groups. With a strong background in MEMS and NEMS, our main goal is the development of Micro and Nanotools based on semiconductor technologies. Our complementary skills allow us to work in the full invention cycle: design, FEM simulation, technology development, fabrication and characterization of micro- and nanosystems.

Micro and Nanotools for Physical Sciences



AFM probes

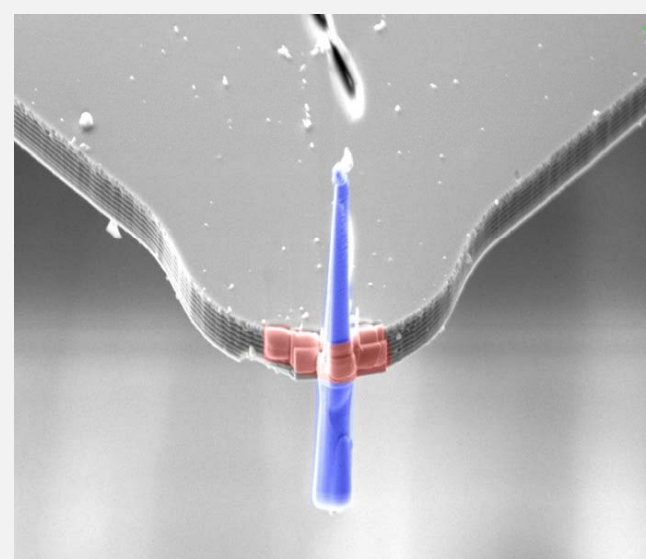
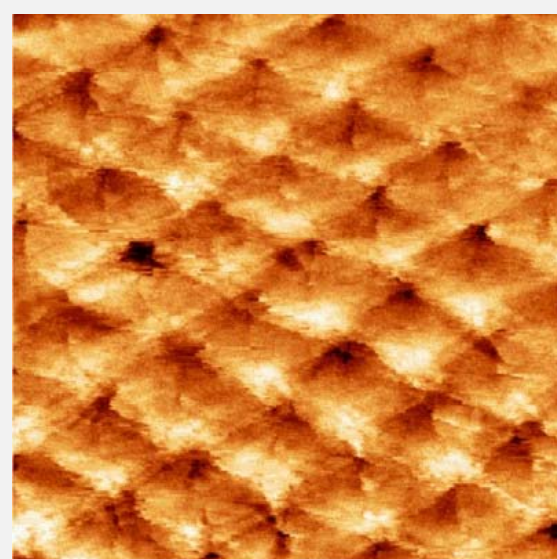
Silicon based AFM probes for materials science.

← Topographic image of a 8 nm thick Aluminum layer.

Nanomagnets for MFM

Nanomachining of bulk magnets with high shape anisotropy and strong crystalline anisotropy.

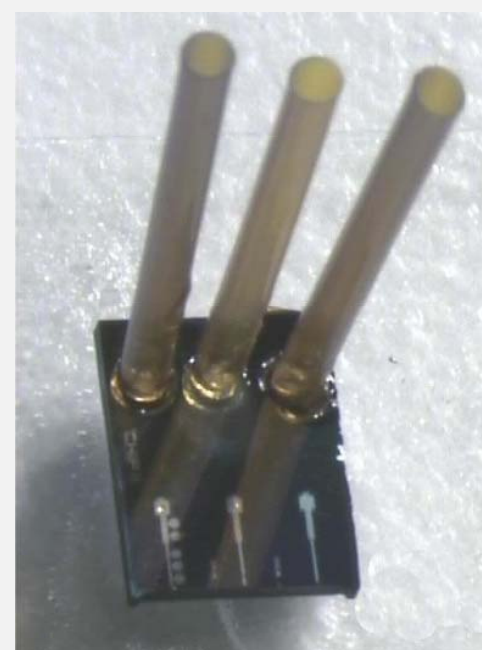
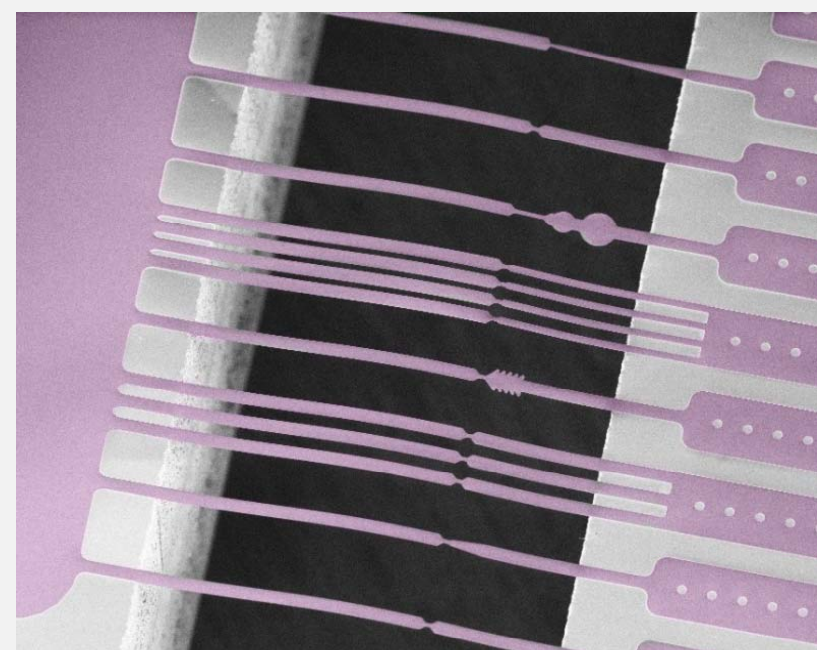
Image of a permalloy antidot layer. →



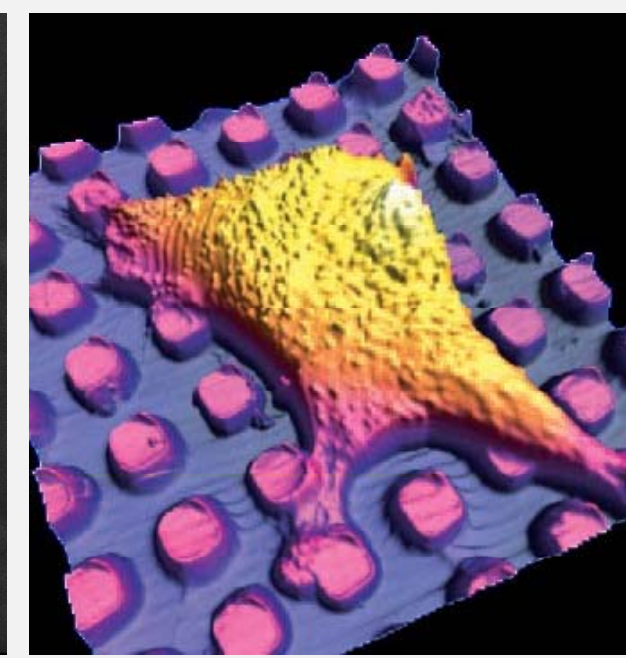
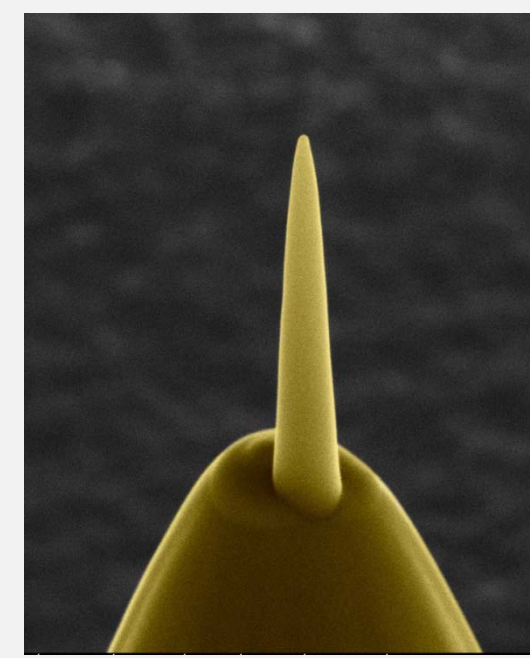
Microfluidics devices

Silicon based micropipettes for molecules deposition.

Submicronic nozzles. →



Micro and Nanotools for Cell Biology



AFM probes

High aspect-ratio silicon tips on AFM probes for Cell Biology.

← Topographic image of MG63 osteoblast cell cultivated over patterned PMMA.

Nano-sharpening of pipettes

Focused-Ion-Beam nanomachining of micropipettes for cell piercing.

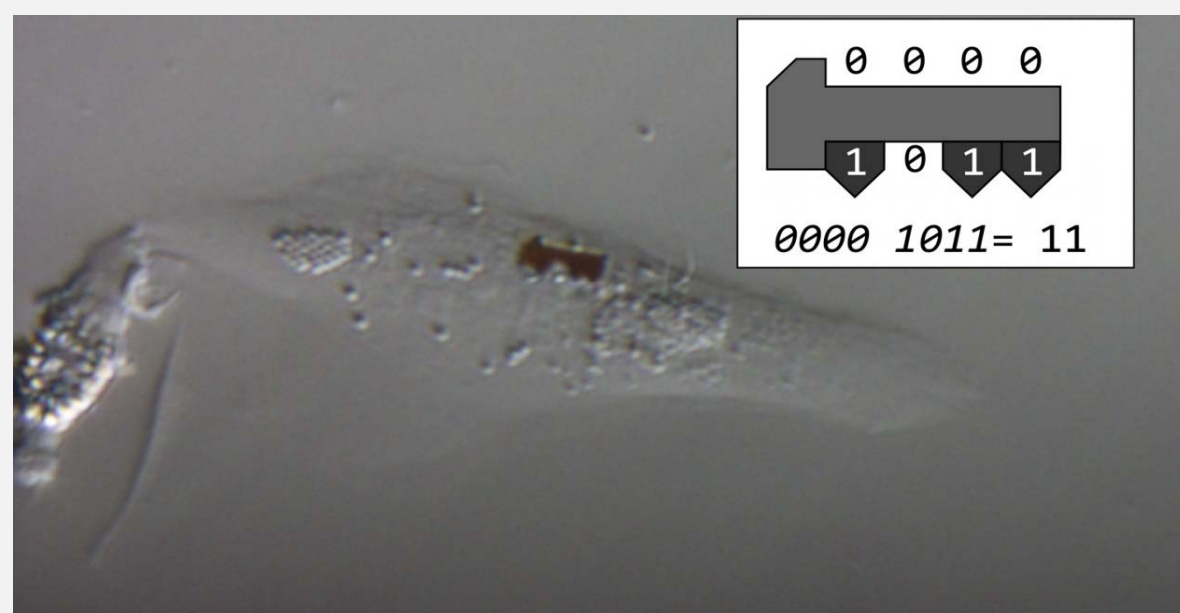
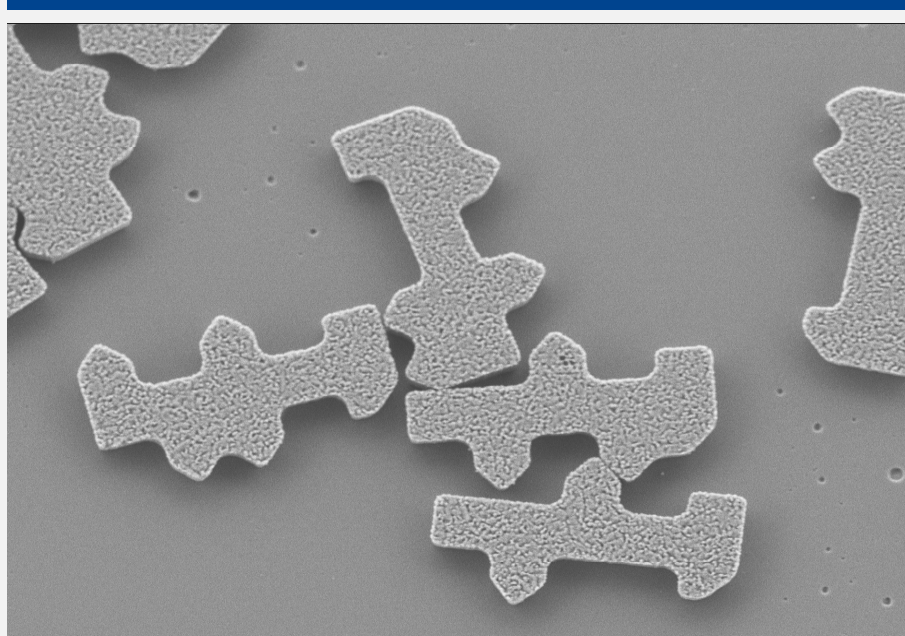


← Mouse embryo piercing test.

Focused-Ion-Beam nanomachining of glass pipettes for cell piercing.

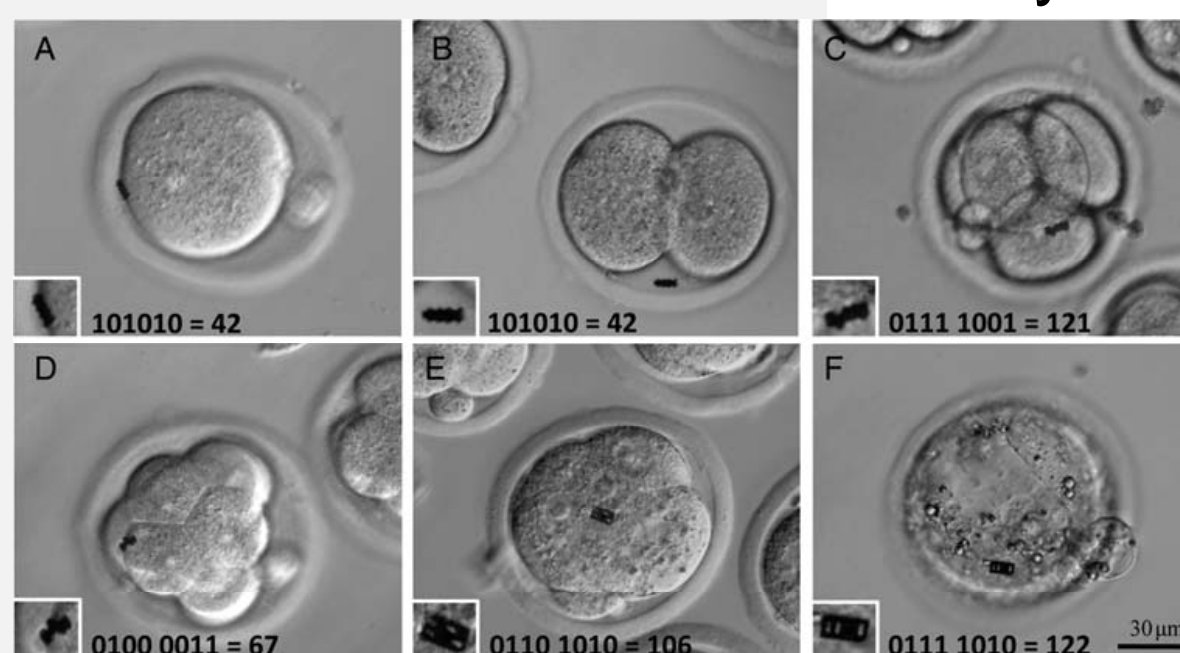
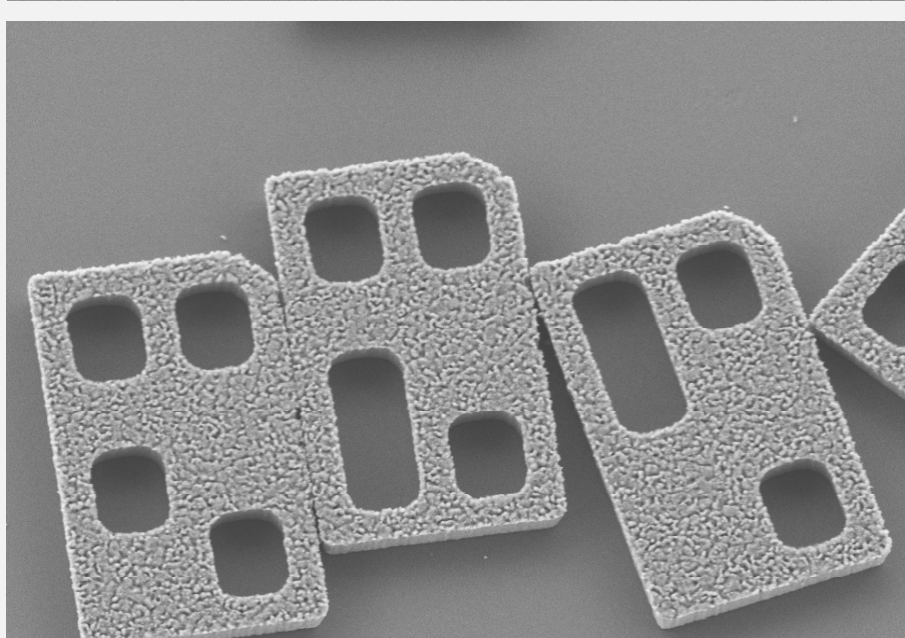
Intracellular Chips

Barcodes for cells

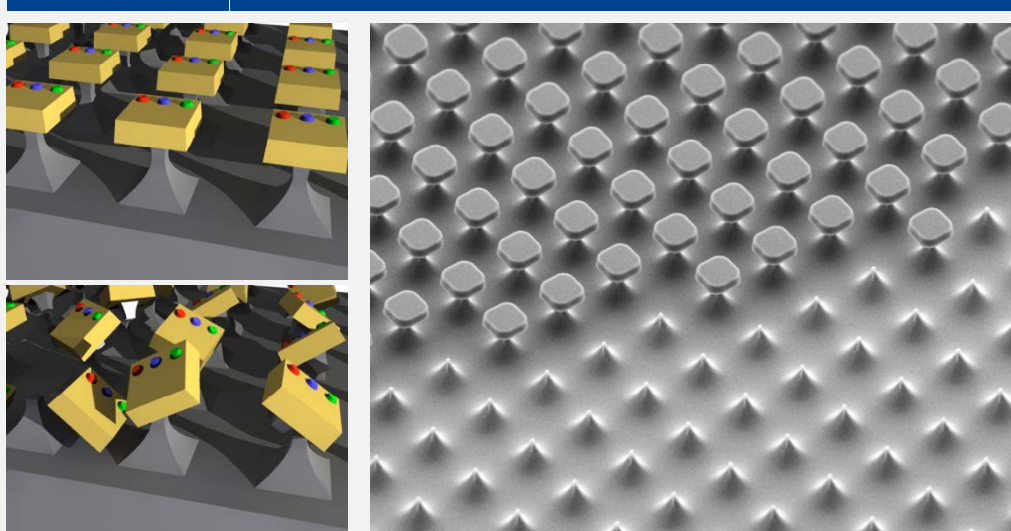


Human Macrophages.

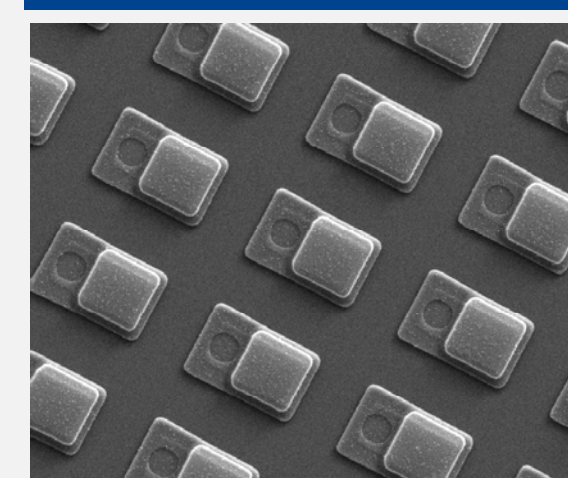
Embryos.



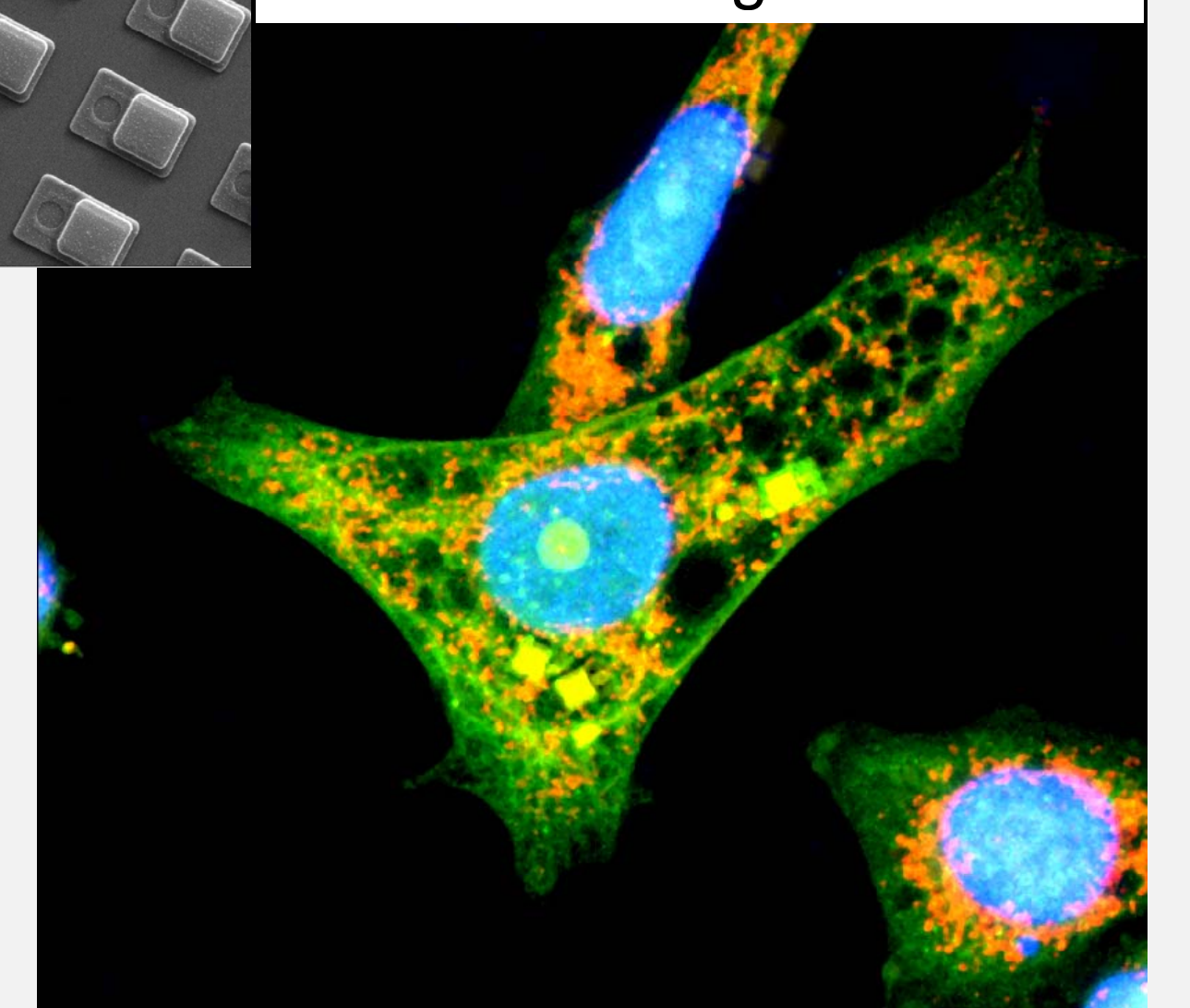
Universal platforms



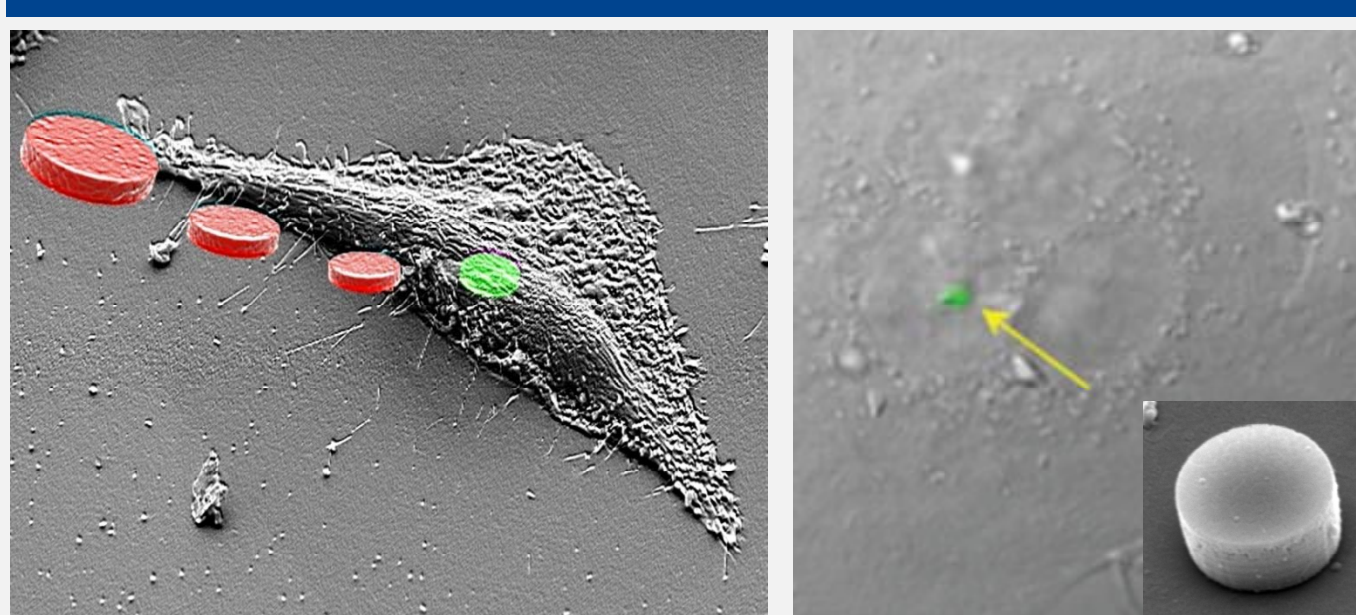
Nanosystems inside cells



Intracellular pressure sensors in living cells.



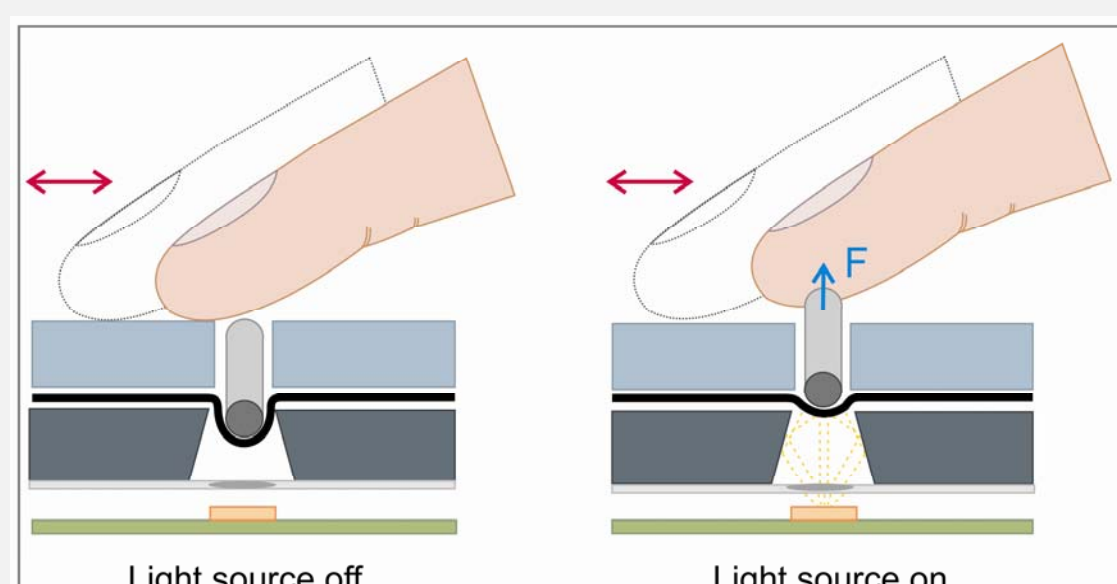
Biomolecular sensors



Sensors and Actuators

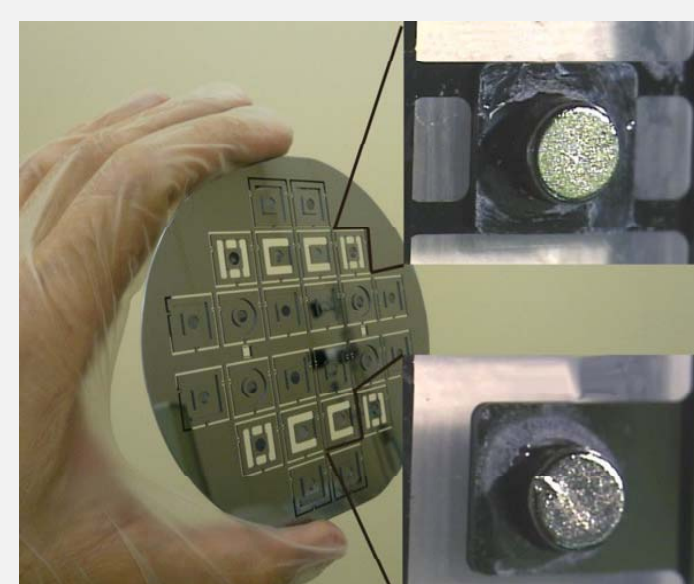
NOMS tactile device

Tactile table prototype based on opto-mechanical actuation of nematic elastomers (Liquid crystalline elastomers with embedded carbon nanotubes), able to represent Braille characters and graphic information.



Magnetic microdevices

Quasi-digital microflow regulator for integrated microfluidic systems.



Silicon gradiometers.

FBAR



FBAR+CNM25 CMOS integration.