# Surface treatment: microfluidic texturing, hydrophilicity and gold nanoparticles

*Karl Fleury-Frenette, Juriy Hastanin, Cédric Lenaerts, Paola Skutnik, Patrick Gailly, Olivier Dubreuil,*
*Dimitrios Kokkinos, Julien Rosin, Thierry Jacquemart, Patricia Hellin, Frédéric Rabecki*
*Surface Micro & Nano Engineering Lab*
*Centre Spatial de Liège / Université de Liège*
*Avenue du Pré Aily, 4031 Angleur*

CSL — Université de Liège

## Original (micro-pillars) texturing

Microfluidic texture (mainly micro-pillars) is ablated by laser on the original plate (PMMA or glass)
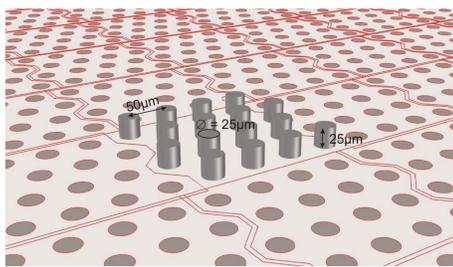


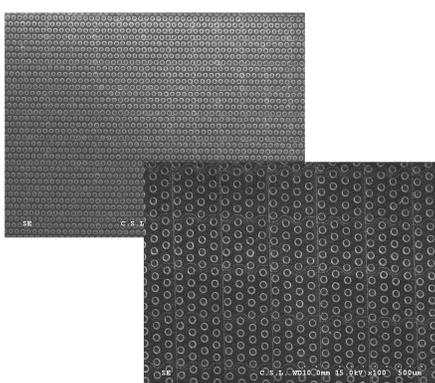*Micro-pillars design for laser machining process (25 µm of height and diameter)*
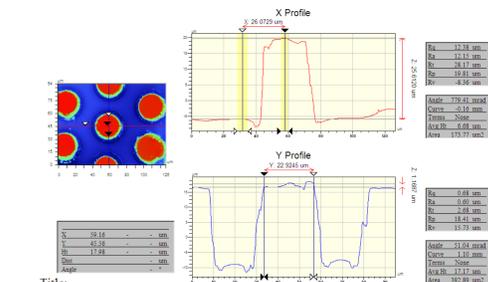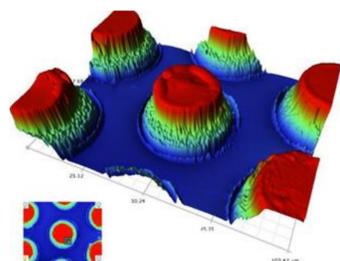
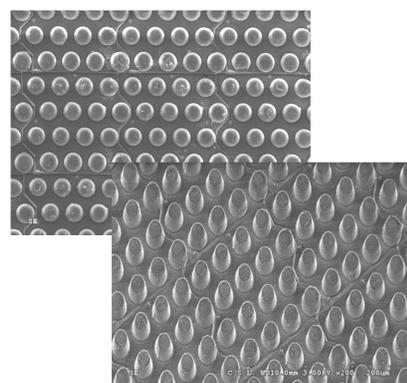*Excimer laser micromaching system*

*Laser ablated PMMA slab*

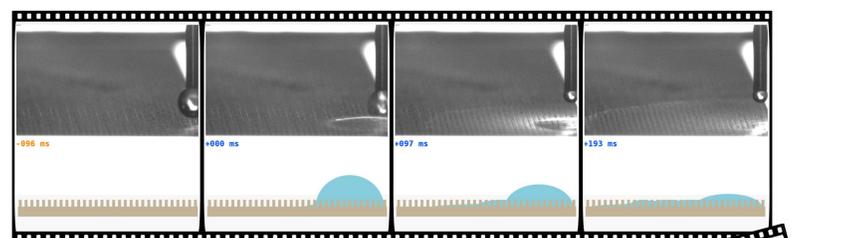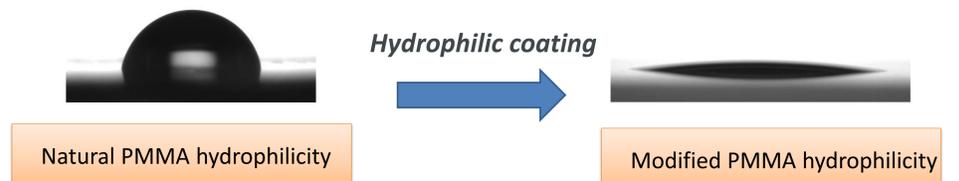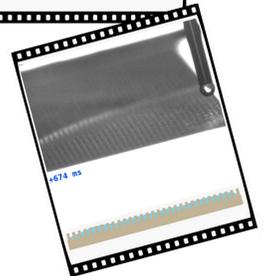*Laser ablated glass slab*

*SEM Microscopy*

*Optical profilometry*

*Micro-pillars geometry and dimensions are controlled by SEM and optical profilometry*

## Hydrophilicity management

*Hydrophilic coating*

Natural PMMA hydrophilicity

Modified PMMA hydrophilicity

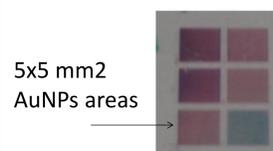The water drop is completely dispersed into the micro-pillars structures in less than 1 sec
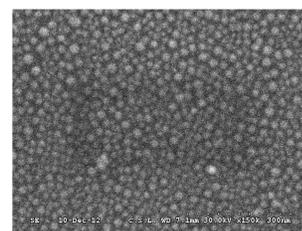
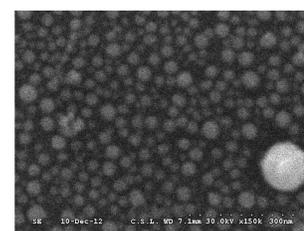## Gold nanoparticles deposition and optical characteristics
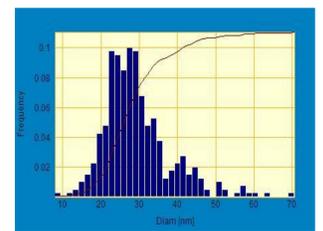
*Gold nanoparticles (AuNPs) are deposited locally*

5x5 mm2 AuNPs areas

- Typical size of AuNPs: ~30 nm
- Size of AuNPs range achievable : 20-70 nm
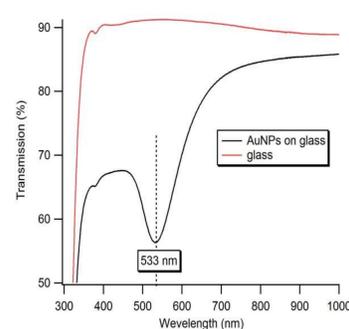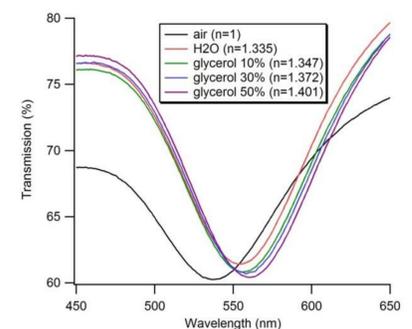- Deposition lateral resolution : a few microns

*Small size AuNPs*

*Medium size AuNPs*

*Typical histogram of AuNPs size*

*Transmission of AuNPs*

*Wavelength redshift of absorption peak of AuNPs with increasing refractive index (n) of medium*