

PRESENTER INFORMATION



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BIOGRAPHICAL SKETCH

Giuseppe Barillaro is Full Professor at the Information Engineering Department of the University of Pisa.

Research at Barillaro's group is focused on the preparation of materials, structures, and systems at the micro and nanoscale with applications in the fields of (nano)photonics, microelectronics, (bio)sensing, and (nano)medicine.

G. Barillaro is author of more than 100 papers in peer-reviewed international journals and holds over 20 patents (10 issued in US). He has led more than 20 research expenditure, at international and national levels on micro and nanostructured materials and platforms for (bio)sensing and (nano)medicine and since 2022 he is the PI of "RESORB" (<https://www.resorb-project.eu>) an EIC Pathfinder Open project funded by the EC with ~3 M€ for the development of implanted bioresorbable sensor systems for tracking biomarkers and drug in vivo.

TITLE: Nanostructured Porous Silicon in Imaging and Biosensing

ABSTRACT

The talk will focus on two topics: i) the use of nanostructured porous silicon for the preparation of silicone lenses encoding photonic or plasmonic optical filter for mobile-phone fluorescence microscopy [1-3]. ii) bioresorbable porous silicon sensors for the detection of markers of clinical interest ex-vivo and in-vivo [4,5].

Proof of concept applications of the lenses to the fluorescence imaging/counting of tumor cells and living microbes with a commercial smartphone, as well as of implantable bioresorbable porous silicon sensor to the in-vivo monitoring of markers will be discussed.

REFERENCE

1. S. Mariani et al., Moldless Printing of Silicone Lenses with Embedded Nanostructured Optical Filters, *Adv. Funct. Mater.*, 1906836 (2019).
2. S. Mariani et al., Maskless Preparation of Spatially-Resolved Plasmonic Nanoparticles on Polydimethylsiloxane via In Situ Fluoride-Assisted Synthesis, *Adv. Funct. Mater.* 2100774 (2021).
3. S. Mariani et al., 4D Printing of Plasmon-Encoded Tunable Polydimethylsiloxane Lenses for On-Field Microscopy of Microbes, *Adv. Optical Mater.* 2101610 (2021)
4. S. Mariani et al., Layer-by-layer biofunctionalization of nanostructured porous silicon for high-sensitivity and high-selectivity label-free affinity biosensing, *Nature Communications*, 9, 5256, 1-13 (2018)
5. M. Corsi et al., Bioresorbable Nanostructured Chemical Sensor for Monitoring of pH Level In Vivo, *Advanced Science* 2202062 (2022).