

## SESIONES CIENTIFICAS DEL CTB VIERNES 17 DE ABRIL DE 2015

### **Prof. Laura M. Lechuga**

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Area of Expertise: photonic biosensors, plasmonic and nanoplasmonic sensors, lab-on-chip devices, optonomechanics biosensors, biofunctionalization, Nanomedicine.

Prof. Laura M. Lechuga received the Ph.D. degree in Chemistry from the University Complutense of Madrid (Spain) in 1992. She is Full Professor of the Spanish National Research Council (CSIC); since 2012 she is Adjunct Professor at the Dept. of Physics&Technology, at the Arctic University (Norway) and since 2013 she is a Distinguished Visiting professor at the Dept. of Microwaves and Photonics, School of Electrical and Computer Sciences, University of Campinas (Brazil).

Prof. Lechuga is the Head of the Nanobiosensors and Bioanalytical Applications Group in the Catalan Institute for Nanoscience and Nanotechnology (ICN2) in Barcelona (Spain). The principal focus of her research program is the technological development of photonic (plasmonics and silicon-based) and nanomechanical biosensors, their integration in portable lab-on-a-chip platforms and their application in clinical and environmental diagnostics. She has published over 160 articles, book chapters and conference proceedings, has 8 families of awarded patents at European, US or international level, and has presented more than 200 invited research papers. She has been the driving force for the establishment of one spin-off company in 2004 (SENSIA, SL) and co-founder of a new spin-off in 2010 (BIOD, SL).

Prof. Lechuga is associate editor of the IEEE Photonics Journal, associate editor of the J. Optics and Laser Technology (Elsevier) and is at the Editorial Board of the Journal of Nanobiosensors in Disease Diagnosis and of the Journal of Sensors. She has been nominated as Fellow of the Optical Society (OSA) in 2014, and she is a member of the International Society for Optical Engineering (SPIE), and member of the European Optical Society (EOS). She is a member of Permanent Steering Committees of Advanced Study Course on Optical Chemical Sensors (ASCOS) and Europt(r)ode Conference Series.

### **“Nanophotonic “point-of-care” biosensors for the next diagnostics generation”**

Modern healthcare is demanding novel diagnostic tools that could enable quick, accurate, reliable, and cost-effective results so that appropriate treatments can be implemented in time, leading to improved clinical outcome. Such hand-held point-of-care (POC) devices, able to deliver an instant diagnostics of our health status at home, at doctor's office, at bed side or at resource-limited settings, could become a reality soon thanks to the last

advances in nanobiosensors, lab-on-a-chip, wireless and smart-phone technologies which promise to surpass the existing challenges, opening the door to a global health access. Although remarkable progress towards POC systems appears continuously in the literature there is a lack of commercial POC devices as general diagnostic tools due to the many technical challenges to be overcome.

The driving force of our research is to achieve such ultrasensitive platforms for POC label-free analysis accomplishing the requirements of disposability and portability. We are using innovative design of nanophotonic biosensors mainly based on nanoplasmonics and silicon photonics. Advantages as miniaturization, sensitivities clinically relevant, robustness, reliability, potential for multiplexing and mass production at low cost can be offered by our nanodevices.

We have demonstrated the suitability of our lab-on-chip photonic biosensor for the clinical diagnostics with extremely sensitivity, directly using untreated human samples, as for the evaluation of hormones related to endocrine disorders and tumours (below 0.1 pg/ml), the detection of infectious microorganisms (at few cfu/ml) or the detection of microRNA biomarkers related to cancer progression, among others.