Title: Enabling (Bio)Sensing And (Nano)Medicine Applications Through Electrochemical Structuring of Silicon at the Micro and Nanoscale

Abstract: When dealing with biosensing and nanomedicine applications the length scale of targets may vary over more than 5 orders of magnitude moving from the molecular level (0.1-1 nm) up to the cell level (1-10 μm).
A number of micro and nanostructuring technologies have been developed over the years to enable the preparation of both structures and systems with length scales suitable to match specific biological targets. However, the extent to which a single technology allows the structuring of materials to be controlled over different length scales is inadequate to encompass the whole range of biological targets.
Electrochemical structuring of silicon emerges over the other micro and nanostructuring technologies as it enables the controlled preparation of structures and systems with length scale tunable over 4 orders of magnitude (from a few nanometers to tens of micrometers). In addition, high flexibility and excellent reliability of the electrochemical structuring of silicon at the micro and nanoscale makes this technology an amazing tool for the straightforward preparation of complex structures and systems for diverse applications in biosensing and nanomedicine from lab-scale development to large-scale manufacturing.
In this talk, advanced nano and microstructuring of silicon via (electro)chemical etching technology will be presented and discussed with emphasis on the preparation of structures and systems for (nano)medicine (e.g. nanopillars for cell transfection, liver on a chip, 3D microincubators for tumor cell screening) to (bio)sensing (e.g. microneedles for transdermal biosensing, optical biosensors for point-of-care clinical applications).