UNIVERSITY OF TRENTO - Italy

Department CIBIO


# Francesca Santoro

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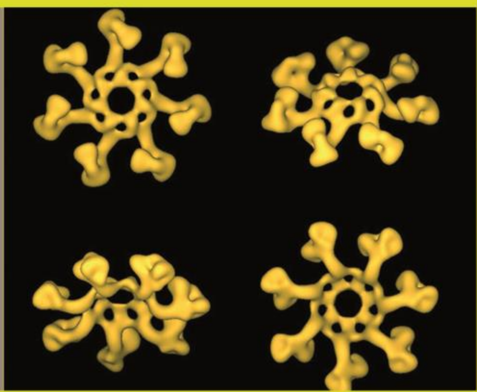

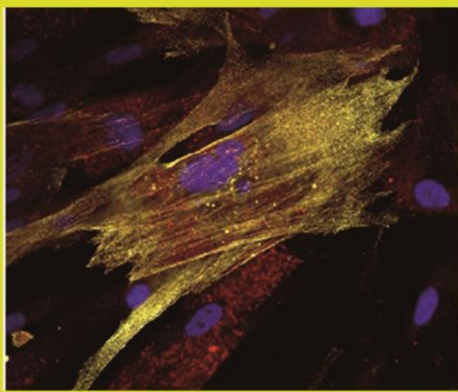

## SEMINAR

**February, 06th**

**10.00 a.m. Aula B103**

**Povo 2**
**via Sommarive, 9**
**Povo, Trento**

# Dimensionality matters in biointerfaces


The interface between biological cells and non-biological materials has profound influences on cellular activities, chronic tissue responses, and ultimately the success of medical implants and bioelectronic devices. For instance, electroactive materials in contact with cells can have very different composition, surface topography and dimensionality. Dimensionality defines the possibility to have planar (2D), pseudo-3D (planar with nano-micropatterned surface)1 and 3D conductive materials (i.e. scaffolds) in bioelectronics devices. Their success for both in vivo and in vitro applications lies in the effective coupling/adhesion of cells/tissues with the devices' surfaces. It is known how a large cleft between the cellular membrane and the electrode surface massively affects the quality of the recorded signals or ultimately the stimulation efficiency of a device. However, this field is hindered by lack of effective means to directly visualize in 3D cell-material interface at the relevant length scale of nanometers. In this work, we explored the use of ultra-thin plasticization technique2 to cells for the first time on materials which differ in dimensionality3, particularly focusing on the optimization of this procedure for 3D cell-materials interfaces which have been unexplored so far. We have characterized how cells differently elongate and deform their membranes in response to the dimensionality of the electroactive materials and the relevant processes at the biointerface. In this way, we are able to define a set of optimal conditions for cell-chip coupling which enable an appropriate approach for designing bioelectronics platforms for both in vivo and in vitro applications in 3 dimensions.



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