Facultad de Informática
Universidad Complutense de Madrid

ANUNCIO DE CONFERENCIA

Electronics Chips in Life Sciences: Challenges and Further Ahead.

Profa. Carlotta Guiducci

Laboratory of Life Science Electronics (CLSE), Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

Sala de Grados • 14 de mayo de 2010 • 15: 00
entrada libre hasta completar el aforo

resumen:

The interface between electronic circuits and life sciences will be one of the focal points of future integrated system design. Several solutions for electronic devices/biological matter interactions are already available and they have proved their potential to be highly-portable systems or high-throughput systems or both.
In this seminar, we will address the paradigm of electronic sensors, circuits and systems as privileged means to interact with biological matter at the higher level of detail while bringing the advantage of almost unlimited choice of signal processing, storing and communication solutions.
Sensing principles will be presented in a physics and biophysics perspective. High-throughput and integration will be addressed with respect to tradeoffs between high density and signal measurability. A set of biomolecule sensing techniques and nanotechnological amplification means will be presented in their application in silicon-chip measurement systems. The seminar will also tackle the compatibility issues of biochemical processes and solid-state technologies and will describe the different possibilities for developing and scale molecular sensing sites on a chip.

sobre Carlotta Guiducci:

Carlotta Guiducci holds a PhD in Electrical Engineering from the University of Bologna (I). She was a postdoc at the Nanobiophysics Lab at École Supérieure de Physique et Chimie Industrielles Paris (F) between 2005 and 2007. Later, she went back to Bologna where she coordinated a joint research group of electrical engineers, physicists and biologists funded by an Integrated Project of The EU (DiNamICS) and by national projects. She recently joined The Institute of Bioengineering at the Swiss Federal Institute of Technology in Lausanne (CH) where she holds a position as Tenure-Track Assistant Professor. Her research activity spanned from the characterization of MOS in quantic regime to the development of novel techniques for sensing biological affinity reactions on surfaces by means of semiconductor sensors and electronic transducers.
She developed in collaboration with Infineon technologies two test chips for DNA detection by capacitance measurements, which successfully demonstrated the feasibility of the technique. She has been working on electrical, electrochemical and optical techniques. She demonstrated and patented the measurement of DNA by UV absorption on non volatile memory cells. Her laboratory team focuses on the design and application of electronic biosensors and is at the forefront of electronic engineering and bioengineering. The sensors address a wide range of applications, from nucleic acid, protein and drug detection to the measurements of bacterial metabolism and they are based on detection principles supporting electronic transduction, in order to couple directly and integrate the sensors themselves with electronic circuitry for data acquisition. Miniaturization of sensing site and the development of parallel systems are the main aims pursued.