



SEMINAIRE

de **09 h à 11 h**, amphi M001, PHELMA, Bât. INP, Minatec,
(ouvert à tous : enseignants, étudiants, chercheurs, administratifs, techniciens)

Jeudi 14 avril 2016

“Modeling and simulation of nanoelectronic (bio) sensor devices, with applications to Bio-FETs and novel high-frequency impedance spectroscopy techniques”

by Luca SELMI
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Abstract: The seminar introduces the field and the needs for nanoelectronic (bio)sensor device modeling and simulation.

Two case studies of sensor modeling, simulation and characterization are examined in detail: nanowire Ion-Sensitive Field Effect Transistors (ISFETs) and novel nanocapacitor arrays for high-frequency impedance spectroscopy. In particular, based on accurate analytical models and numerical simulation tools, we describe the operating principle and the potential of high-frequency impedance spectroscopy techniques for the detection of nano- and micro-particles and cells beyond the Debye screening limit in a physiological solution environment. Recent experimental results confirming this new sensing principle are presented to confirm the theory and calibrate the models.

Luca Selmi received the Ph.D. degree in electronic engineering from the University of Bologna, Bologna, Italy, in 1992. He was a Visiting Scientist with the Microwave Technology Division, Hewlett Packard, Santa Rosa, CA, USA, from April 1989 to June 1999. Since 2000, he has been a Full Professor of electronics with the University of Udine, Udine, Italy, where he is currently responsible of a research group on nanoelectronics. He held technical and/or coordination responsibility in several European commission research projects in the field of micro and nanoelectronics. He has co-authored more than 200 papers in refereed journals and conference proceedings, including more than 35 International Electron Devices Meeting (IEDM) papers. His current research interests include electron device modeling and characterization, as well as high frequency circuit design for telecom applications. Dr. Selmi is currently an Associate Editor of the IEEE ELECTRON DEVICE LETTERS. He has served as a Technical Program Committee Member of several electron device conferences such as IEDM, ESSDERC, INFOS, and ULIS.

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