



## SEMINAIRE

(de 13 h à 14 h, amphithéâtre, Bât. INP, MINATEC,  
ouvert aux chercheurs des autres laboratoires)

Jeudi 20 novembre 2008

“Advanced charge storage memories: from silicon nanocrystals to  
molecular devices”

par Barbara De SALVO

**Abstract:** In this presentation, we will make a general overview of different technological approaches suitable for charge storage memories. Several solutions to extend the floating gate Flash memory technology to the 22nm nodes and beyond, are presented. In particular, new modules (discrete traps memories, and more specifically silicon nanocrystal memories and nitride-based memories), new materials (as high-k materials for the interpoly layer) and innovative architectures (as FinFlash memories and new 3D nanowire architectures) will be discussed. Moreover, hybrid approaches which make use of organic molecules as storage sites will be also introduced. Finally the main theoretical limits of ultra-scaled charge storage memories (i.e. reliability issues linked to few electron phenomena) will be analyzed, opening the path to the introduction of disruptive technologies based on new storage mechanisms.

*Barbara De Salvo received the B.S. and M.S. in electronics engineering from the University of Parma, Italy (1996) and the Ph.D. degree in microelectronics from the INPG (1999). In the Department of Information Technology at the University of Parma (Italy), she worked on electrical characterization and modeling of Analog to Digital converters, while in the LPCS-CNRS/ INPG (1996-99) she made research on reliability of non-volatile Flash memories, gate oxide transport mechanisms and degradation phenomena. She joined LETI as a research scientist in 1999. Since March 2002 to March 2004, B. De Salvo has been the coordinator of the ADAMANT project (“Advanced memories based on discrete-traps”, focused in particular on Silicon Nano-Crystal and Nitride-based Non-Volatile Memories) funded by the European Commission (Fifth Framework Programme). She currently manages the “Advanced Memory Technologies Laboratory” in LETI, covering several R&D projects funded by the French/European institutions and several industrial partnerships. Her current research interests include the technological development and physical understanding of advanced memory technologies such as Si-bulk NVMs, Silicon and Metal Nano-crystals, new high-k dielectrics/metal gates stacks for SONOS/TANOS memories, SOI-based ultra-scaled FinFlash architectures and new 3D integration paths, but also alternative technologies such as Phase-Change memories, back-end metal oxide resistive memories (named OXRAM), organic molecular and polymer-based memories. She is author or co-author of more than 150 articles in International Refereed Journals and Conferences.*

*Institut de Microélectronique, Electromagnétisme et Photonique  
MINATEC, INPG, 3 Parvis Louis Neel, BP 257, 38016 GRENOBLE CEDEX 1, France  
Tél. +33 (0) 456.529.503 - Fax. +33 (0) 456.529.501  
UMR 5130 CNRS INPG UJF  
Institut National Polytechnique de GRENOBLE*