

## CONFÉRENCIERS INVITÉS KEYNOTE SPEAKERS

### Wireless Implantable Microsystems For Neural Recording and Stimulation

**Dr. Khalil Najafi**, Center For Wireless Integrated Microsystems (WIMS), University of Michigan, USA.

**June 23, 2008**

**11:00am - 12 noon**



**-- Abstract --** The combination of micromachined sensors (MEMS), low-power electronics, and wireless power and data transfer will have a profound impact on many aspects of our lives, from health care to environmental monitoring and homeland security. These Wireless Integrated Microsystems (WIMS) will especially play a major role in the biomedical arena, where they have been and will continue to be used for restoring function in individuals affected by deafness, blindness, paralysis, Parkinson, epilepsy, and other biological disorders. By directly interfacing with the body, it is possible to sense biological signals, use these signals as controls, and provide electrical/chemical stimuli to specific organs, where needed, to restore lost function. This talk will review research conducted at the University of Michigan on implantable biomedical devices for use in closed-loop neural prostheses. It will present the latest developments in micromachined microprobes for recording neural activity and electrical stimulation, the design of electronic circuits required for processing neural signals, the use of wireless transmission of power and data to/from implantable systems, and the development of hermetic and biocompatible packaging and encapsulation technologies compatible with long-term operation in the body. Future challenges as well as opportunities for implantable microsystems aimed at overcoming many biological disorders will be discussed.

**-- Biography --** Khalil Najafi is the Schlumberger Professor of Engineering in the EECS department, University of Michigan. He received the B.S., M.S., and the Ph.D. degrees in 1980, 1981, and 1986 respectively, all in Electrical Engineering from the University of Michigan, Ann Arbor. He served as the Director of the Solid-State Electronics Laboratory from 1998-2005, has been the director of NSF's National Nanotechnology Infrastructure Network (NNIN) since 2004, and the deputy director of the NSF ERC on Wireless Integrated Microsystems (WIMS). His research interests include: micromachining technologies, micromachined sensors, actuators, and MEMS; analog integrated circuits; implantable biomedical microsystems; micropackaging; and low-power wireless sensing/actuating systems. Dr. Najafi is an Associate Editor for the IEEE Journal of Micro Electromechanical Systems (JMEMS), and the Journal of Micromechanics and Microengineering, Institute of Physics Publishing, and an editor for the Journal of Sensors and Materials. He also served as the Associate Editor for IEEE Journal of Solid-State Circuits from 2000-2004, the Editor for Solid-State Sensors for IEEE Transactions on Electron Devices from 1996-2006, and the associate editor for IEEE Trans. Biomedical Engineering from 1999-2000. He is a Fellow of the IEEE and the AIBME.

## CONFÉRENCIERS INVITÉS KEYNOTE SPEAKERS

BAW Technologies for Radiofrequency Filters and Duplexers

Dr. **Éric Kerhervé**, ENSEIRB, IMS Lab, France

**June 24, 2008**  
**10:45am - 11:45am**



**-- Abstract --** The growth of wireless communications worldwide has led to the emergence of several cellular wireless standards such as GSM, DCS, PCS and UMTS. These standards, together with the more recent wireless data systems, as WLAN standards, drive the development in the wireless domain. In order to obtain low-cost solutions, the optimal multi-standard terminal should be as simple and small as possible and should offer the integration of heterogeneous technologies. The advent of high-yield bulk acoustic wave (BAW) technology compatible with VLSI process, offers some new opportunities for radiofrequency (RF) circuit integration. In this talk, we detail issues concerning the implementation of BAW filters and duplexer and their potential impact on the RF receiver and transmitter performances.

**-- Biography --** Eric Kerhervé received the Ph.D. degree in Electrical Engineering from University of Bordeaux, France in 1994. He joined ENSEIRB and the IMS Laboratory in 1996, where he is currently a Professor in Microelectronics and Microwave applications. His main areas of research are the design of RF, microwave and millimeter-wave circuits (power amplifiers and filters) in silicon and BAW technologies. He is involved in European projects, as MEDEA+ UPPERMOST and IST MOBILIS, to develop silicon power amplifiers and BAW duplexer. He has authored or co-authored more than 190 technical papers in this field, and was awarded 12 patents. He has organized 5 workshops on advanced silicon technologies for radiofrequency and millimeter-wave applications. He is involved in the technical program committees of various international conferences (ICECS, IMOC, NEWCAS, EuMIC, SBCCI) and he was the chair of the international IEEE ICECS2006 conference. He is a member of the IEEE-CAS, IEEE-MTT and IEEE SSCS.

## CONFÉRENCIERS INVITÉS KEYNOTE SPEAKERS

Trends in complex SoC Design: From technology variability to multiprocessor architectures.

**Dr. Jean-René Lèquepeys**, Head of ASIC Design Department, LETI-CEA, France.

**June 25, 2008**  
**10:45am - 11:45am**



-- **Abstract** -- Emerging 3D stacking techniques combined with the scaling of CMOS technologies give to the SoC architects the possibility of designing very complex multi-application systems. New parallel architectures are proposed to bring flexibility and facilitate the management of the complexity, but the new challenge that the architects have to address, concurrently with the power saving policies, is the technology variability which becomes more and more important in advanced technologies. At system level, the architecture has to take this limitation into account, to reach the better performance the technology could provide.

-- **Biography** -- Jean-René Lèquepeys graduated from the Ecole Supérieure d'Electricité (SUPELEC) of Paris in 1983. After teaching 2 years in Morocco, he joined CEA in 1985 as a R&D Engineer and became leader of a Group for the evaluation of solutions for security enhancement. In 1993, he joined the CEA-LETI, in Grenoble, and worked on image processing projects. In 1995, he took the leadership of the radio communications projects at CEA-LETI. In 1999, he was promoted as "Telecom and Smart Devices Program Manager" being involved in various fields related to communications. He is currently Manager of the ASIC Design Department of CEA-LETI since 2004. This Department has 110 researchers involved in SoC evolution and trends (GALS, NoC and reconfigurable building blocks), readout circuits for sensors and for CMOS imagers, RF MEMS, antennas, biochips, ultra low power radio links, UWB ...using the latest CMOS, BiCMOS or Above IC technologies. He acted as an expert for European Commission, for CEA-TECHNOLOGIES and for the ANVAR agency. He is also a member of the executive team of the RNRT and of the National Research Agency Program dealing with "Future Architecture". He authored more than 20 publications and 15 patents in the field of wireless radio transmission.