Instituto Nacional de Astrofísica, Óptica y Electrónica

Laboratorio de Innovación en MEMS (LI-MEMS)

Ceremonia de Inauguración

Tonantzintla, Pue., 19-20 de abril de 2010

Auditorio del Centro de Información

Minicoloquio Internacional sobre Nano-electrónica y su impacto social y económico en el mundo

Patrocinado por IEEE

- **Dr. Subramanian S. Iyer**
  IBM Microelectronics, EUA
- **Dr. M. Jamal Deen**
  McMaster University, Canada
- **Dr. Fernando Guarin**
  IBM Microelectronics, EUA
- **Dr. Rafael Rios**
  INTEL, EUA
- **Dr. Cor Claeys**
  IMEC, Bélgica

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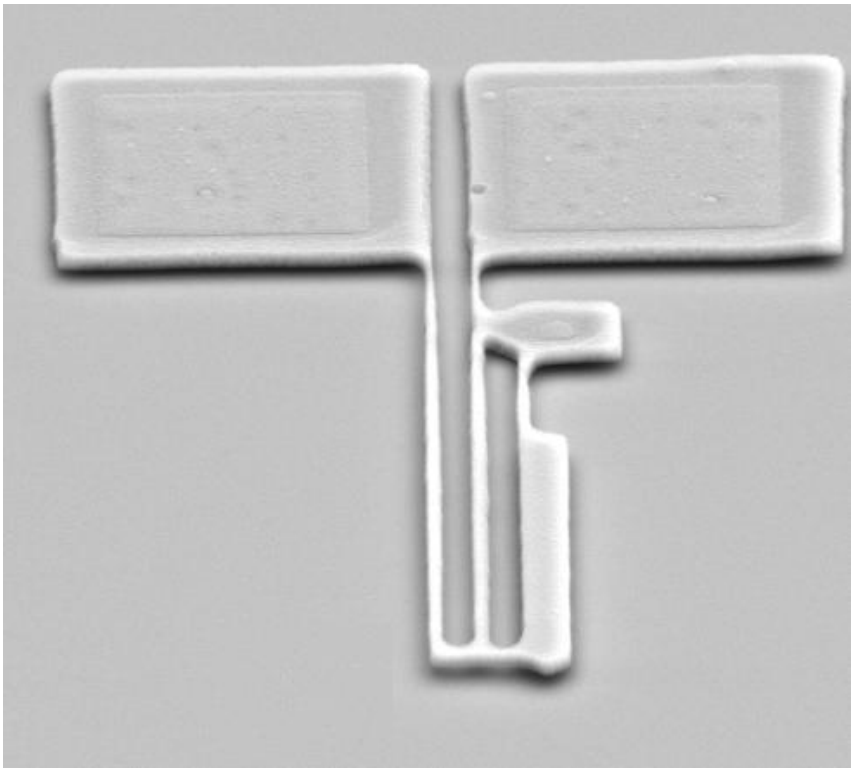
Inauguración del LI-MEMS
Programa de actividades

Lunes 19 de abril de 2010
Auditorio del Centro de Información

10:00 Ceremonia de inauguración

11:30 Rueda de Prensa



Inauguración del LI-MEMS
Programa de actividades

12:30 Apertura del mini-coloquio internacional
Evento patrocinado por ***IEEE***

"La nanoelectrónica y su impacto social y económico a nivel mundial"

13:00 hrs

"From deep trenches to skyscrapers: The journey from eDRAM to the three dimensional integration"

Dr Subramanian S. Iyer

Chief Technologist for the Semiconductor Research and Development Center, IBM Systems & Technology Group, NY, USA.

Memory technology and the memory business has for many years been the engine that powered technological innovations in the semiconductors especially in the area of lithography and innovative micro-structural engineering. While stand alone memory itself has been commoditized, when embedded in high performance logic it provides incredible leverage for high performance processors, network and mobile appliances, and almost every application. In this talk, we will explore the course of memory in systems, especially DRAM, integration of deep trench technology into high performance logic, the value it brings as well as the collateral advantages it has brought about in power management, noise decoupling, autonomic chip repair and its potential evolution into 3-dimensional chip technology.

Lunes 19 de abril de 2010

16:00 hrs

"Trends and challenges in Micro- and Nanoelectronics for Societal Applications"

Dr. Cor Claeys

Interuniversity MicroElectronics Center IMEC, Leuven, Belgium

The Research Agenda for micro- and nano-electronics contains three main domains, i.e., More Moore (scaling the microelectronics systems according to the law of Moore), Beyond CMOS (future microelectronic components) and More than Moore (increasing the functionality of the electronic system). For each of them some general trends and challenges are addressed. The convergence of the top-down technology, with bottom-up methods derived from fundamental disciplines such as materials physics, chemistry and biotechnology is opening a totally new world of applications. The diversity of the 'More than Moore' domain, includes applications related to ambient intelligence, automotives, molecular electronics, nano-biotechnology, polymer electronics, sustainable energy based on photovoltaic cells and human healthcare.

Martes 20 de abril de 2010

10:00 hrs

"Low-cost, high-sensitivity electrical and optical biosensing systems"

Dr. M. Jamal Deen

Professor and Senior Canada Research Chair in Information Technology,
McMaster University, Canada

Recently there has been an increasing interest in the development of microelectronic-based sensors for the detection and identification of biological species. For example, label-free DNA detection has been made possible by the use of field-effect type of sensors. In these systems, the intrinsic charge of the DNA molecules is detected through the use of modified metal-oxide-semiconductor (MOS) field-effect transistors (FETs) where the gate area has been functionalized to make them sensitive to the biological species of interest. In this presentation, first, we will discuss an electrical biosensor that we have been developing for pathogen detection related to water and food quality. We will discuss the detailed modeling of the electrolyte-sensor system and will show that by detailed analyses of both signal and noise characteristics of the integrated sensor system, that it is possible to optimize the biosensor's performance. We will show how to create highly integrated and parallel detection systems by integrating the sensor and the processing electronics on the same chip and what are the resulting system's performance characteristics. In the second part of the presentation, we will briefly introduce another type of sensor, an optical biosensor for auto-fluorescence imaging used to provide diagnostic biological/medical information on the functional properties of tissues. We will describe CMOS-based imagers capable of capturing the time and wavelength domain responses of tissue auto-fluorescence signals.

Martes 20 de abril de 2010

11:30 hrs

"Intelligent water management and semiconductor fabricators"

Dr. Fernando Guarin

Senior Scientist at the IBM Microelectronics Semiconductor Research Development Center, IBM, NY, USA.

The multiple advances in technology have provided us with unprecedented amounts of information at continually decreasing costs. The level of instrumentation grows daily, with ever increasing intelligence and ability to communicate and automate many processes and industries. This increased information content gives us a unique path to alleviate and find solutions to the problems of many of the most important issues facing our world today. One of the most critical issues is the availability of water. Over the last hundred years we have experienced a six fold increase in the use of water, and the demand continues to increase with population growth. Water has been a plentiful resource but we are finally coming to the realization that it is not an unlimited resource. Water is precious and necessary to sustain life, yet we continue to pollute and waste large amounts. Up to 45% of the world's water handled by water systems is lost due to leaking pipes. Even though it might return to the aquifer, we must consider how much energy is being wasted pumping and treating that lost water.

In this talk, we will present an overview of the systems for data collection and information management implemented in IBM's two largest semiconductor fabricators; Burlington, Vermont and East Fishkill, New York. We will then examine how IBM is leveraging the many decades of treating water as a precious resource in our fabricators to provide very efficient solutions through initiatives like "Big Green Solutions" and "Smart Planet".

Martes 20 de abril de 2010

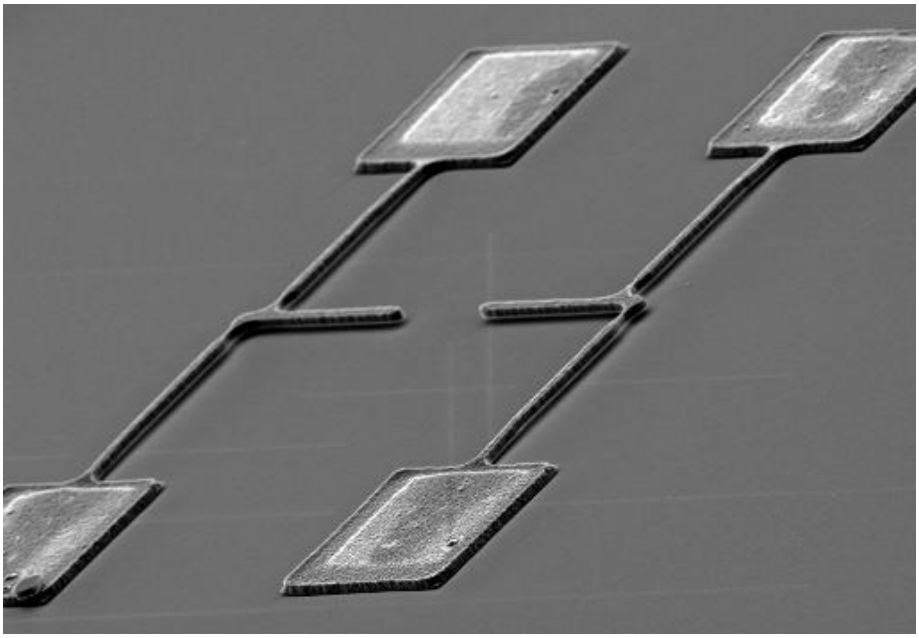
15:00 hrs

"The Delay of Forever: Improving and extending the Nano realm"

Dr. Rafael Rios

Senior Scientist at INTEL, USA.

The exponential decrease of feature sizes has been fueled by Moore's law for over 40 years, and is still in full swing today. This pursue of ever smaller building blocks is not just a fad driven by a self-fulfilling prophecy. Rather, the scaling down of semiconductor components has been the driving force behind the computer revolution. As Moore also stated, no exponential is forever but we can delay "forever". In this talk, we will explore the innovations leading to extending Moore's law into nano-scale feature sizes, including advances in device design, computational lithography, and materials engineering. More advances in these fields are still needed to enable continued scaling in the near future. In particular, researchers are looking more closely at 3-D integration as a means of continued scaling. Both at the device level and at chip level, 3-D integration may play a major role in future technologies. At least for the foreseeable future, there seems to be room "at the top" to continue the delay of forever



Martes 20 de abril de 2010

17:00 hrs

Round table:

"The nano-era in Latin America"
and closing session

Participants:

S. Iyer, IBM, USA
C. Claeys, IMEC, Belgium
M. J. Deen, McMaster, Canada
F. Guarin, IBM, USA
R. Rios, INTEL, USA
W. Moreno, Ibero-American Science and Technology Education Consortium ISTEC
D. L. Kendall, President of StarMega, USA.
A. Torres, INAOE, Mexico