

More than Moore Era: Convergence of Bio-Nano-Information Technologies

GUEST SPEAKER

Prof. V. Ramgopal Rao

Indian Institute of Technology, Bombay

When: **15th September 2010, 9.30 a.m. to 10.30 a.m.**

Where: **Institute of Microelectronics, Singapore**

11 Science Park Road Singapore Science Park II Singapore 117685

Abstract

CMOS scaling is expected to slow down owing to the huge cost, power and variability constraints. This has necessitated a paradigm shift in the CMOS scaling trends from the "More Moore" to the "More than Moore", allowing for the integration of heterogeneous technologies on a CMOS platform. The key idea is to achieve a functional diversification on the chip by empowering the CMOS technologies with a variety of "sense & interact" functions. In this talk we will look at the nano-electro-mechanical-systems (NEMS) as one such enabling platform for sensor integration with the CMOS.

Many of the bio-chemical sensing applications require ultra sensitive, low cost and disposable sensors. In this work we present a novel polymer process technology for realisation of a highly sensitive nano-particle based piezo-resistive polymer composite cantilevers that can be fabricated at sub 100°C process temperatures, allowing for the integration of these technologies on a CMOS die. Electro-mechanical characterisation of the fabricated microcantilevers yielded a resonance frequency which is a few tens of kHz and a deflection sensitivity in the range of 1.1 ppm ($\Delta R/R$) for a nanometer of deflection. These cantilevers have been used for a range of applications such as for detection of explosive molecules such as TNT/RDX in the parts-per-trillion level of concentrations as well as for developing an integrated system to provide point-of-care diagnostic support for cardiovascular diseases. Prototypes of these systems are currently under development at IIT Bombay for further field trials.

About the Speaker



Dr. V. Ramgopal Rao is a Professor in the Department of Electrical Engineering and heads the Centre of Excellence in Nanoelectronics at IIT Bombay. Dr. Rao has over 250 publications in the area of Electron Devices and Nanoelectronics in refereed international journals and conference proceedings and holds three patents, with ten US patents currently pending.

Prof. Rao received the coveted Shanti Swarup Bhatnagar Prize in Engineering Sciences (the highest national award for researchers in India) awarded by the Hon'ble Prime Minister, Govt of India in 2005 for his work on Electron Devices. He is also a recipient of the 2004 Swarnajayanti Fellowship award from DST (which is instituted to mark 50 years of India's independence), 2007 IBM Faculty award, the 2008 MRSI-ICSC Annual Prize and the 2009 TechnoMentor award from the Indian Semiconductor Association. He is an Editor for the IEEE Transactions on Electron Devices in the CMOS Devices and Technology area and serves on the Editorial boards of various other international journals. Dr. Rao is a Fellow of the Indian National Academy of Engineering and a Fellow of the Indian Academy of Sciences. He is a Distinguished Lecturer, IEEE Electron Devices Society and interacts closely with many semiconductor industries including Intel, IBM, Infineon, Maxim and Texas Instruments. He has served on the programme/organising committees of a large number of international conferences in the area of electron devices and was Chairman, IEEE AP/ED Bombay Chapter during 2002-2003. He currently serves on the executive committee of the IEEE Bombay Section besides being the vice-chair, IEEE Asia-Pacific Regions/Chapters Subcommittee.

Registration

Pre-registration is required. Closing date is 13th September 2010. To register, please log on:
http://eastar.eventshub.sg/ems_wb_Details.aspx?CallID=28&EventID=131632

Location Map

