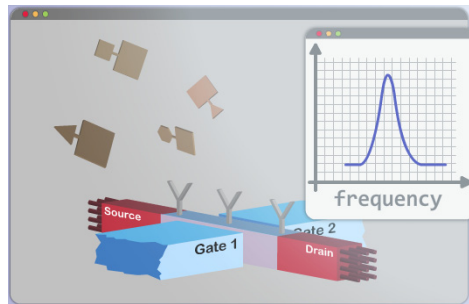


# Nano-Electro-Mechanical Devices for Integrated Sensing and Switching

Satellite workshop to ESSDERC/ESSCIRC 2010

Date: September 17<sup>th</sup>, 2010.



## Technical program co-chairs:

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## Abstract:

This Workshop is supported by the NEMSIC FP7 STREP funded by the European Commission, see: <http://www.nemsic.org/>

To detect a carcinogen, a pharmaceutically active compound or toxic gases in the environment within seconds thanks to a handheld device on an electronic chip: such a revolution that may be made possible through the integration of so-called NEMS, miniaturized electromechanical structures in which at least one dimension is of nanometre scale.

The devices targeted in the framework of the FP7 STREP project NEMSIC at the heart of the "intelligent sensor system" are suspended nanowires excited to vibrate at their resonance frequencies. The wire is chemically or biologically functionalized to make it selective for target molecules like carcinogens. Binding of target molecules leads to an increase in the mass of the wire which in turn will change its resonance frequency and vibrate at a lower frequency (think of a violin: the thicker the string the lower the tone).

The workshop will include state-of-the-art progress reports on NEMS devices and applications, with invited keynotes from USA and Japan and the detailed technical reports on the status of NEMSIC research.

## Programme:

**8.45 – 9.00:** A.M. Ionescu, Ecole Polytechnique Fédérale de Lausanne, Switzerland

*“Opening and short overview of NEMSIC project”*

**9.00 – 9.30:** **Keynote 1:** S. Bhave, Cornell University, USA

*“MEMS resonators and resonant transistors”*

**9.30 – 10.00:** Y. Tsuchiya, F. Arab Hassani, M. A. Ghiass, Z. Moktadir, and H. Mizuta  
School of Electronics and Computer Sc., University of Southampton, UK

*“Suspended silicon nanowire sensing based on conductance and mass detection”*

**10.00 – 10.30:** Coffee Break

10.30 – 11.00: E. Ollier, CEA-LETI, France  
*“Towards integration of Nanowires with FDSOI transistors:  
from design to technology”*

11.00 – 11.30: D. Grogg, S. Bartch, D. Tsamados, A.M. Ionescu  
Ecole Polytechnique Fédérale de Lausanne, Switzerland  
*“Resonant body FinFETs”*

11.30 – 12.00: V. Petrescu, IMEC. The Netherlands  
*“Circuit design for NEMS/MEMS resonator gas sensors”*

12.00 – 13.00: Lunch

13.00 – 13.30: **Keynote 2:** Shunri Oda, Tokyo Institute of Technology, Japan.  
*“NEMS advanced research topics at Tokyo Institute of Technology”*

13.30 – 14.00: B. Serban and C. Cobianu  
ACS Sensors & Wireless Laboratory Bucharest, Honeywell Romania SRL  
*“Novel concepts for NO<sub>2</sub> detection by differential resonant nanosensing”*

14.00 – 14.30: D. Bertrand  
Dpt of Neuroscience, Medical Faculty & HiQscreen, Switzerland  
*“NEMS in biological applications”*

14.30 – 15.00: V. Cherman<sup>1</sup>, D. Tsamados<sup>2</sup>  
<sup>1</sup>IMEC, Belgium, <sup>2</sup>Ecole Polytechnique Fédérale de Lausanne, Switzerland.  
*“Nanoscale effects in electro-mechanical structures”*

15.00 – 15.30: M. Enachescu and S. Cotofana  
Computer Engineering Laboratory, Faculty of Electrical Engineering, Mathematics  
and Computer Science, Delft University of Technology, the Netherlands.  
*“Suspended Gate -Field Effect Transistor (SG-FET) Based Advanced Power  
Management in CMOS ICs”*

15.30 – 16.00: D. Aquaviva, A. Magrez  
Ecole Polytechnique Fédérale de Lausanne, Switzerland  
*“CNT arrays MEMS: research activities in FP7 project VIACARBON”*