

Duration: 08:30 - 17:50

Room: Budapest

WS-07

High-Q RF MEMS Devices and Multiphysical Cross-Layer Circuit Design

Organisers:

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Abstract

Micro-electromechanical systems (MEMS) have found their way to a multitude of applications in automotive or medical systems or consumer electronics. Due to their electro-mechanical functionalities, in many cases, MEMS offer solutions superior or unprecedented compared to pure micro-electronic concepts.

In addition, MEMS devices, circuits, and systems operating at radio frequencies (RF) represent an extremely promising area of research. RF-MEMS offer the potential to overcome serious restrictions of their micro-electronic counterparts such as parasitic effects, non-linearities, susceptibility to high operating voltages, or steady-state power consumption. Micro-electro-mechanical devices enable very compact high-Q filters and low-phase noise reference oscillators. Combined with distributed transmission line technology, compact tunable and reconfigurable filters and phase shifters can be composed.

In order to ultimately exploit the inherent advantages of combined microelectronic and micro-electro-mechanical functionalities, advanced modelling and design strategies have been developed, aiming towards a unified design approach at device, circuit, and system levels.

Accordingly, this workshop presents an expert panel on advanced high-Q RF MEMS devices and multiphysical cross-layer circuit design for a multitude of circuit applications, including but also reaching well beyond MEMS switches. The workshop addresses young as well as advanced engineering scientists working in the fascinating field of RF-MEMS research.

Programme

08:30 - 08:40 Welcome and Workshop Overview

08:40 - 09:20 Modelling and Implementation of High Q and High Electromechanical Coupling MEMS Resonators Based on Lithium Niobate Thin Films

Songbin Gong, University of Illinois at Urbana Champaign, USA

09:20 - 10:00 Engineering High Q CMOS-Compatible Aluminum Nitride on Silicon MEMS Resonators

Joshua E.-Y. Lee, City University Hong Kong, Hong Kong

10:00 - 10:10 Discussion

10:10 - 10:50 Break

10:50 - 11:35 RF MEMS-Based Q-Preserving Tuning

Héctor J. De Los Santos, NanoMEMS Research, USA

11:35 - 12:20 Multiphysical MEMS and CMOS Co-Simulation Approach Based on a Silicon-Ceramic Composite Substrate

Sebastian Gropp, Johannes Stegner, Uwe Stehr, TU Ilmenau, Germany

12:20 - 12:30 Discussion

12:30 - 13:50 Break

13:50 - 14:35 Coventor's Tools for Design and Simulation of RF MEMS Resonators

Arnaud Parent, Coventor, France

14:35 - 15:20 Design Flow for High Volume CMOS-Integrated RFMEMS

Arthur Morris, WiSpry, USA

15:20 - 15:30 Discussion

15:30 - 16:10 Break

16:10 - 16:45 Zero-Level Packaged Switches and Switched Capacitors for Reconfigurable RF and Microwave Circuits

Pierre Blondy, XLIM, Université de Limoges, France

16:45 - 17:20 RF MEMS Switch Modelling by using Artificial Neuronal Networks (ANN)

Larissa Vietzorreck, Zlatica Marinković, Tomislav Ćirić, Olivera Pronić-Rančić, Vera Marković, TU Munich, Germany

17:20 - 17:50 Non-Linearity in Surface Acoustic Wave Devices for Wireless Communications at 2 GHz Frequency - From Wafer Measurements to PCB Simulation

Vikrant Chauhan, Amelie Hagelauer, Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany