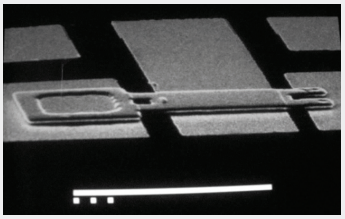
Institute of Physical Electronics of Kaunas University of Technology (Lithuania) - IPE

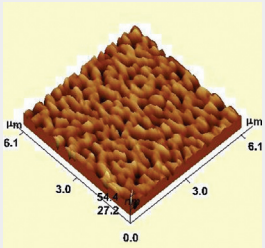
www.fei.lt

Brief description of the institute: Institute of Physical Electronics of Kaunas University of Technology was founded in 1994 after reorganization of self-supporting Scientific Center of Semiconductor Microelectronics "Microlira" of Kaunas Institute of Radio Measurement Technique. In 2003 Institute was reorganized into the independent Institute, having the status of University Institute. Functions of the founder were entrusted to Kaunas University of Technology. Institute is funded by National Science Programme "Formation and research of surface nanometric structures and thin layers interactions". IPE takes part in "Eureka"project E!2776 - FACTORY INCAF "Applying of new coatings in forming processes", Science programme "Gillibert" "Mechanical properties of thin films", Nordic Energy Research Program "Formation of itrium stabilized zirconium oxide coatings by plasma spraying", NATO Science Programme - Cooperative Science and Technology "Nano-structured functional coatings for optical and lubricating applications". Institute is one of the main organisers of International Conference - School "Advanced materials and technologies", which every year takes place in Palanga, Lithuania.

Main research activities: include nanotechnology (thin films, surface engineering, application of ion and plasma methods for formation of nanostructures and nanomaterials) and optical document security (microoptical elements, interference filters, development of new materials and structures). Currently, IPE is employed in the development of polymeric nanocomposites, nanoimprint lithography for system polymer-semiconductor, analysis of the diffusive and mirror reflection of normal and tangential displacements of microobjects, ion beam synthesis of carbon nanostructures, formation and investigations of high power microelectromechanical switches.



Microelectromechanical switch made at IPE



25% PS - 75% PMMA nanostructured polymer bend on crystalline silicon (100) substrate

Prof. Sigitas TAMULEVICIUS is the Director of the Institute of Physical Electronics (IPE) ot the Kaunas University of Technology, Lithuania. The fields of research are: thin films, vacuum and plasma technologies, optical measurements, surface and interface phenomena, solid oxide fuel cells. Prof. Tamulevicius has experience in international projects, such as: Eureka INCAF project, Giliber project "Mechanical properties of thin films", Nordic Energy Research Programme and support actions, being the organiser of the anual International Conference- School "Advanced materials and technologies". He is an Expert member of the Lithuanian Academy of Sciences, Head of the research group "Ion induced phenomena in the heterostructures", Winner of the National Award for Science for 2001, Chairman of the qualification Commission for Education and Research in Materials Science at Kaunas University of Technology, Member of the European Materials Research Society, Peer reviewer of Institute of Physics and IOP Publishing Ltd (UK) and FP5 and FP6 expert.

SABANCI UNIVERSITY (Turkey) - MICROELECTRONICS PROGRAM

(http://micro.sabanciuniv.edu)

Main Principles of Action

- Assuming the leadership role in certain areas / technologies
- Establishing and maintaining strong ties with the industry
- Maintaining strong collaboration with international partners
- Disseminating expertise / educating industrial partners
- Encouraging the development of commercial products / applications

Sponsored Projects

- Development of micromachined-chemical sensors, TUBITAK Turkey, Sept. 01 - Sept. 2004
- Design and Synthesis of Photoresist for 157 nm Lithography, NSF-USA, Feb 02-Feb 04
- Development of RF-MEMS technology: Resonator, oscillator and filter, Internal, Feb 02 - Sept 03
- Transmitter/Receiver Front-End Electronic Design for 2-D Acoustic Transducers, TUBITAK, Sept.03-Sept.04
- TARGET (Top Amplifier Research Groups in a European Team, (www.target-net.org), NoE, EU-6th Framework Project, Jan03-Dec07

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Education: BSc. (90) in Electrical Engineering, Erciyes University, Kayseri, Turkey•MSc. (93) and PhD (97) in Electrical Engineering, Vanderbilt University, TN, USA. Areas of Interest: Sensors and actuators, analog ICs, MEMS, modeling and simulation of semiconductor devices, wide-bandgap semiconductors

Research Areas

- Microelectromechanical Systems: Design, Modeling, simulation and fabrication of silicon-based MEMS for different applications; acceleration sensors, pressure sensors, chemical sensors, ultrasonic transducers, infrared sensors, RF-MEMS; resonators, oscillators, filters, coupler.
- Very Large-Scale Integrated Circuits/Systems (VLSI) Design and Technology: Analyzation, design, simulation and test of semiconductor devices and Very Large-Scale Integrated Circuits (VLSI) for different appications; Analog, Digital, and Mixed Signal VLSI Circuits (examples: High Speed A/D, D/A , and DC/DC Converters, PLL, Swithed-Capacitors, Sigma Delta Modulators Circuits, RF IC, Hardware realization of dedicated DSP architectures, Modeling and Simulation of Semiconductor Devices.

Laboratories / Facilities

- Test and Characterization Laboratory: High Frequency and Optoelectronics Lab equipped with state-of-the-art test equipment such as Spectrum Analyzers, RF-signal generators, IC Probe Station, Logic Analysis System, Semiconductor Parameter Analyzer, High Speed Digitizing oscilloscopes, Surface Profiler.
- Process Laboratory: Class 1000 Clean Room complete with:Wet processing station, mask aligner, Reactive Ion Etcher, Reactive Sputtering System, Tube Furnace and associated equipments, Chip & Wire Bonder.
- CAD and Simulation Laboratory: equipped with several Sun workstations loaded with design software such as Cadence, Synopsys, Silvaco, HPADS, MEMSCAP, MEMCAD, ANSYS with design lib (Alcatel, AMS, UMC)