

## 2004

### International projects

- **“Micro and Nanotechnologies Going to Eastern Europe through networking” (MINAEAST-NET)** (2004-2006), FP6 project INCO-CT-2004-510470, [www.minaeast.net](http://www.minaeast.net).

The project was carried out together with National Institute for Research and Development in Microtechnologies (Romania), Budapest University of Technology & Economics, Dept. of Electron Devices (Hungary), University of Ljubljana, Faculty of Electrical Engineering, Laboratory of Microsensor Structures and Electronics (Slovenia), Institute of Control and System Research, Dept. of Sensor Systems and Modelling (Bulgaria), Institute of Solid State Physics of the Bulgarian Academy of Sciences, Laboratory of Semiconductor Heterostructures, Kaunas University of Technology, Ultrasound Institute (Lithuania), Technical University of Kosice, Metallurgical Faculty, Dept. of Materials Science (Slovakia), Sabanci University, Faculty of Engineering & Natural Sciences, Dept. of Microelectronics Engineering, Sabanci (Turkey), National Centre of Scientific Research Demokritos, Institute for Microelectronics, NCSR Demokritos (Greece), Association pour le Developpement de la Recherche, Techniques of Informatics and Microelectronics for computer Architecture (France), Technical University of Berlin, Research Centre of Microperipherals Technology (Germany), Institute of Electron Technology, Department of Silicon Microsystem and Nanostructure Technology (Poland).

The aim of the project was to support a concerted effort for preparing the participation of ACC's and new Member States to projects in FP6 on micro and nanotechnologies. The main objective was networking on micro and nanotechnologies.

- **“Nanoimprint Lithography for Novel 2 and 3 Dimensional Nanostructures” (3D NANOPRINT)** (2004-2007), FP6 project COOP-CT-2004-5112667,, [www.3dnanoprint.org](http://www.3dnanoprint.org).

The project was carried out together with 8 partners from various European countries.

Project aimed at the development of a complete process technology with the necessary tools to produce 3-dimensional nanostructures with ultra-high precision. Nanoimprint lithography was improved and adapted to 3D printing processes. As a reference application of nanoimprint lithography 3-dimensional photonic crystals were produced, since the optical properties of such devices are extremely sensitive to the quality of the production process and therefore are an excellent indicator.

### National projects

- **“Application of Micromechanical Systems Technologies”** (2004), funded by the Lithuanian State Science and Studies Foundation, No. T-04169.

Surface micromachining technique was applied to produce electrostatically actuated microelectromechanical (MEMS) switch. Advanced nanoimprint technique was successfully applied for the creation of optically variable diffractive images by combining direct imprint of single oriented grating, forming of desired graphic art with a set of polished stamps and reactive ion etching. Electronic speckle pattern interferometer was used to register the dynamics of changes of small geometrical dimensions of samples. The dependence between phase composition of the diamond like carbon films and mechanical stresses was established using this technique. An ultrasonically enhanced anodic electrochemical etching was developed to fabricate light-emitting porous silicon material.

## **Self-supporting projects**

- **“Research of the Influence of Technological and Structural Parameters of Adhesive Layer on the Properties of Hot Stamped Diffractive Optical Security Elements”** (2004), research contract with company Ramona, funded by Lithuanian State Science and Studies Foundation.

Hot stamping adhesive was created. Influence of the structure of adhesive and technological parameters of the forming process of adhesive layer on the properties of hot stamped diffractive optical elements was determined.