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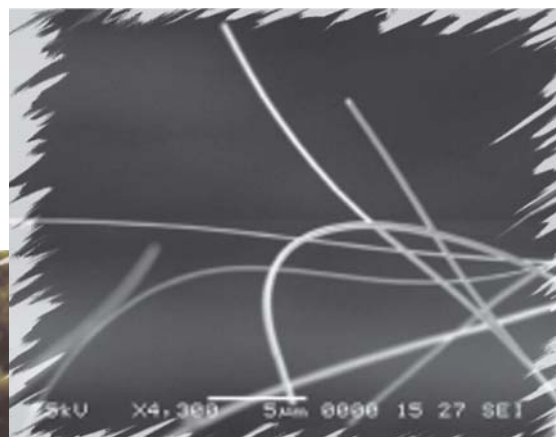
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AFM nanolithography:
Polarization-patterned PZT film with complex
patterns of written words "micro, nano"
(scan area: $1 \times 1 \mu^2$)



Carbon nanotubes growth in air by
new catalytic method

Kaunas University of Technology (page 5)
Lithuania

Edited by:
National Institute for Research and Development in Microtechnologies
(IMT-Bucharest, www.imt.ro)
Ministry of Education and Research, Romania

Previous issues on web: www.imt.ro/mnt



Design for Micro & Nano Manufacture (DfMM) News

web page: <http://www.patent-dfmm.org>

Coordinator: University of Lancaster (UK), Dr. A Richardson (A.Richardson@Lancaster.ac.uk)

The NoE Patent-DfMM aims to establish a collaborative team to provide European industry with support in the field of "design for micro nano manufacture" to ensure that problems affecting the manufacture and reliability of products based on micro nano technologies (MNT) can be addressed before prototype and pre-production.

Workshop on Design for Reliability and Manufacturability in MNT, 25 April 2006, Stresa, Lago Maggiore, Italy

Co-organised by the EC-funded Network of Excellence "Design for Micro & Nano Manufacture" (PATENT-DfMM) and the NEXUS Methodology Working Groups "Reliability & Test" and "Design Modelling Simulation". PATENT-DfMM was launched in 2004 and aims to establish a collaborative team to provide European industry with support in the field of "Design for Micro and Nano Manufacture (DfMM)" to ensure that problems affecting the manufacturing and reliability of products based on micro nano technologies (MNT) can be addressed before prototyping and production. More information: www.patent-dfmm.org

PATENT-DfMM co-operates worldwide to coordinate research and services in DfMM related topics. The network is supported by an educational programme addressing DfMM topics in industry and academia. This combines training courses and educational initiatives that already exist for DfMM, but also develops new ones that are needed to lower the barriers to commercialisation for the next generation of MNT based products.

Objective of this workshop

This workshop builds on industry experience in microsystems manufacturing as discussed recently within the MEMS Industry Group METRIC workshops and NEXUS Methodology Working Group meetings. Main emphasis will be on reliability and test problems, where design methodologies can lead to significant improvements. Industry's design and reliability needs will be discussed and latest research results and new approaches will be proposed by the research community.

Workshop programme – outline

Morning session: Industry needs and current research in Reliability and Test for MNT

- How do industrial microsystems manufacturers deal with reliability and test?
- What is specific for reliability and test in high volume production?
- What are the main challenges for research?
- Presentation of current research initiatives and projects in reliability and test

Afternoon session: Building Reliability and Test into the MNT design flow

- How are reliability and test issues currently built into an industrial design flow?
- What do Design, Modelling and Simulation Tools offer to support reliability and test?
- How can methodologies, tools and databases be combined?
- Presentation of current research initiatives and projects to build reliability and test issues into tools
- How can researchers help industry (especially SMEs) to optimise reliability and test?

PATENT-DfMM is also organising a panel discussion at DTIP (27 Apr) on "Design for Reliability and Test of Microsystems" with key industry panelists.

Contact: Patric Salomon, 4M2C, Berlin, Germany, E-mail: Patric.salomon@4m2c.com

Technology Roadmapping for Packaging of MOEMS and RF MEMS

The first roadmapping **PATENT-DfMM** event, hosted by HWU (16 Feb 06, Edinburgh), was a great success. With more than half of the 30 participants coming from industry, technological trends, bottlenecks and investment opportunities in packaging of MOEMS and RF MEMS were collected and discussed in small working groups. The workshop was viewed as innovative and very useful by all participants and a lot of progress was made during this meeting. The transcription process into a roadmap format through the project team has begun. The second meeting will be held at the Fraunhofer IZM Berlin in Germany on 8 June

2006 – further active contributors are welcome to attend. For more information please visit our website.

For more information please visit <http://www.patent-dfmm.org>.

iMEMS 2006 International MEMS Conference, 9-12 May 06, Biopolis, Singapore

It aims to provide an opportunity for academicians, professionals & industrialists in various related fields from all over the world to come together and learn from each other. An additional goal of the conference is to provide a place for academicians, professionals, industrialists with cross-disciplinary interests related to MEMS to meet and interact with members inside and outside their own particular disciplines. For topic areas please visit the conference website

<http://nanomicro.org/imems06/>.

Call for Papers: COMS2006, Florida, 27-31 Aug 2006

Abstract Submission Deadline: 21 Apr 2006

The 11th International Conference on the Commercialization of Micro and Nano Systems (COMS 2006) will be held in St Petersburg, Florida, USA, 27-31 Aug 2006. COMS fosters the commercialization of micro and nanotechnologies and addresses commercialization issues unique to these emerging and disruptive technologies. COMS 2006 will bring together key personnel from all over the world and from every sector of the supply chain, including government representatives, top researchers in the field, educators, relevant publication sources, equipment suppliers, end users, and financial experts. The small tech community gathers at COMS conferences to learn from others, share their own knowledge, discuss and argue points of view - all of which contribute to the advancement of this emerging field. COMS 2006 addresses the issues related to building successful MNT firms, regions and educational programs. An exhibition of equipment suppliers, service providers, product suppliers and consultants will be held in conjunction with COMS 2006. More information: www.mancef-coms2006.org

Call for Papers: EUROSENSORS XX, 17 - 20 Sep 06, Göteborg, Sweden

Submission Deadline: 28 April 2006

Since its establishment in 1987, the Eurosensors series of conferences is the only European forum to cover the entire field of Microsystem technology. The Eurosensors conference provides an excellent opportunity to bring together European scientists and engineers from academy, research institutes and companies to present and discuss the latest results in the general field of solid-state sensors, actuators, microsystems and nanosystems. The conference goals are to stimulate interaction and knowledge exchange between the delegates in a friendly atmosphere.

Subjects for papers and further details:

www.EUROSENSORS2006.com

MSc in Micro and Nanotechnology at Lancaster University, UK

The Micro and Nanotechnology Masters course is a unique and timely opportunity for engineering or physics graduate to enter an interdisciplinary research or commercial R&D career in MNT. A good balance between technical, management and social science content makes this course directly applicable to entrepreneurs in existing, as well as new businesses in the MNT area. This course is organised in a modular structure that allows part time intensive learning. List of modules and further information:

<http://www.engineering.lancs.ac.uk/postgraduate/nano>

Contact: Evelyn Shaw, Lancaster University, UK, Email: evelyn.shaw@lancs.ac.uk

The publication of this page is supported by the **network of excellence PATENT - DfMM**

Results of Advanced Methods and Tools for Handling & Assembly in Microtechnology
EC FP6 Marie Curie Research Training Network

ASSEMIC- Advanced Handling and Assembly in Microtechnology (www.assemic.net) is a Marie Curie Research Training Network which is devoted to training and research in handling and assembly in the microdimension, involving advanced methods and tools and providing a multidisciplinary, complementary approach, which joined 14 EU countries and is coordinated by Prof. Werner Brenner from ISAS-TU Vienna (Werner.Brenner@TUWien.ac.at).

The Network is an important opportunity for East European countries to be involved in new and innovative collaborative research in the field of micro-nanotechnologies, especially in handling and assembly of hybrid micro-systems.

ASSEMIC include also teams from Less Favoured Regions, Candidate Countries and Associate Countries. Two institutes from East countries are trained and hosted fellows: Warsaw University of Technology and IMT Bucharest. Also many appointed ESR (Early Stage Researcher) and ER (Experienced Researcher) are coming from East Europe: Bulgaria, Belarus, Hungary, Moldavia, Poland, Romania, Serbia. They are provided with intensive training on relevant topics within the project, in host institutes from West European countries, strengthening the ability to work in interdisciplinary teams.

The network offers an excellent research and training "platform" for promoting cooperation and interaction among Member States, Candidate Countries and Associated Countries, joining their experience, knowledge, enthusiasm of young fellows for getting more scientific results in the emerging field of micro-nanotechnologies, contributing to the research integration in ERA.

In 2006 the ASSEMIC Network stated his 3rd year of activity. A lot of progress in term of scientific knowledge has been done by the fellows, supervised by the scientist in charge of their host institutes. Also a special attention was focused on training and dissemination: Summer Schools, Workshop, Open Academic Seminars, Info Days with the participation of SMEs and Industry were organized.

We present some highlights, of each workpackage, of the cooperative work of the fellows (currently 18) appointed and trained in the ASSEMIC Marie Curie Training Network.

Workpackage I

Micropositioning involves high-accuracy positioning and integration of position-sensing devices for sensory feedback in microhandling applications. One of the highlights of ToK in this WP was the large effort of UNINOVA's ESR to integrate and demonstrate the polysilicon optical array sensor – a low-cost device in comparison to normal silicon photosensors). IMT also performed very relevant work on design and simulation of micropositioning proximity sensors based on photodiodes and optical waveguides using interference phenomena.

Furthermore, Seibersdorf began cooperation with RAL for investigating the use of SU8 microcantilever arrays in autonomous mobile platforms for microrobots. Seibersdorf has designed and developed special non-silicon substrates with vertical interconnects for the production of the cantilever arrays studied at RAL, which are based on the bimorph thermal actuation principle. This innovative approach paves the way for highly efficient mechanical and electrical integration of cheap polymer actuator devices. Further contributions comprise the work of IMT and Uni-Oldenburg on microrobotics modelling and enhancement of mobile robots for manipulation in an SEM chamber.

Workpackage II

Microhandling involves techniques and tools for microhandling and micro-manipulation operations, such as pick-and-place, alignment, etc. The work on gripper systems has led to a considerable number of novel microgripping prototypes and designs. ISAS's magnetic microgripper has been integrated into Robotiker's microrobot. Nascatec's grippers have been made available to all ASSEMIC partners, which has led to an important number of cooperation projects. For example, integration of Nascatec's gripper with Robotiker's microrobot and position feedback with UNINOVA's.

Experiments for the purpose of coating Nascatec's grippers with special selected materials investigated and chosen by WUT and FORTH are being carried out and could represent a great innovation in micro-handling technology by enabling enhanced conditions for coping with the so-called sticking effect. Other methods implemented and/or tested by another group of partners for enabling sensory feedback from end effectors were: a three-axis force sensor, a realtime reflection and triangulation 3D position sensor, ink marking and FIB modified grippers for visual recognition of the tips (Uni-OI, UNINOVA, SSSA).



Fig. 1 SSSA polymer ink marking

Moreover, a number of results on stainless steel gripper tips have been reported concerning automated and/or teleoperated assembly stations (involved partners: Robotiker, Uni-OI, ISAS, SSSA and Seibersdorf Research). Even though automated assembly stations do exist and a number of

systems are commercially available, there is still room for innovation. Specifically, Uni-OI is also working on a solution for satisfying the need for an easy way to couple and decouple different haptic devices to and from the currently existing control loop by integrating an available haptic device (SensAble PHATOM) and integration of a 1-DOF end effector for force-feedback-enabled gripper control into its stylus. This would represent a novel device currently not available for suitable operation of micro-robots with haptic devices specific to large-scale industry. Significant progress has also been reported for the task devoted to biological and medical applications. One important result is the joint effort by several partners to use technology being researched in Progenika for functionalizing arrays of cantilevers supplied by Nascatec, RAL and IMT (Fig. 2).



Fig. 2 Microcantilevers (IMT)

Workpackage III
Microassembly is devoted to advanced tools and systems for microassembly applications, and also involves joining and bonding issues. A particular highlight is the implementation of a new concept for bonding parts from 50 to 300 μm by softening glue applied in a solid state with a focused and concentrated hot gas stream as a result of external cooperation with a German university. Experimental results were in agreement with ANSYS's finite element analysis simulation. Further work has also been performed by FhG/ILT on pick & join tools, which will be the basis for planned cooperation with other ASSEMIC

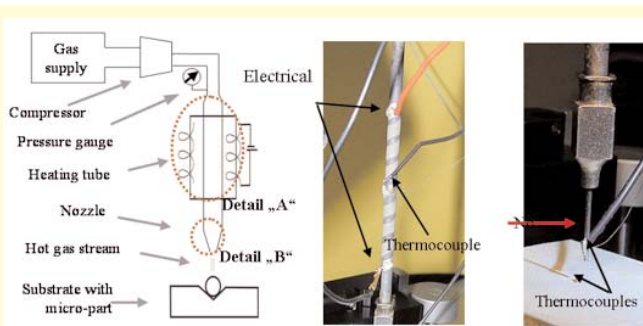


Fig 3. a) Schema of experimental set-up for micro-joining by hot gas stream. b) Photograph of the heating element realized on a metal tube in thick film technology equipped with a thermocouple and electrical connections. c) Photograph of the nozzle and substrate carrying thermocouples (TU Vienna)

partners. ILT, SSSA, ISAS and FSRM are not only performing theoretical investigation of microassembly systems, such systems are also being tested for the assembly of hybrid microsystems, such as sealing polymeric microfluidic devices, micro-solderer resistors (150x300 μm in size), optical fibers in grooves and 8x8 cross connection switches.

Workpackage IV

Automation of industrial microassembly, started in 2005, focuses on two different aspects. Firstly, automated handling and assembly with intelligent control techniques is being explored. An initial study of feasibility, with contributions by Robotiker, Seibersdorf, Uni-OI and WUT, has already been reported in the relevant Deliverable. Secondly, a special effort has been made relating to the issue of testing and characterization of assembled microsystems, which is also very important. One of the more outstanding results is cooperation in developing a method of automated characterization of Nascatec's integrated microcantilever devices by machine vision (Robotiker) and/or optical array sensor (UNINOVA). Characterization of micro-cantilevers is currently done in a manual process. Automation of the calibration process of single cantilevers, and especially of cantilever arrays, leads to an important increase in reliability and speed during device characterization. Other highlights of this Workpackage are WUT's rig prototype for testing adhesive, tribological, dynamic and mechanical properties of MEMS structures; SSSA's characterization of SMA and piezoelectric actuators (cooperation with Seibersdorf Research); and testing of IPMC. FORTH has presented results on hardness tests of thin metal oxide films candidates for the elimination of parasitic effects. Finally, the microdevice torque measurement system developed at the ISAS also deserves special mention. Based on the cable-brake method, it was designed as a test device for mini- and micromotors.

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Announcements

EMPS 2006 - European Microelectronics and Packaging Symposium

22 - 24 May 2006
Terme Catez, Slovenia

The European Microelectronics and Packaging Symposium with Table-Top Exhibition, EMPS, is an international forum for presenting and discussing recent developments and future trends in the multidisciplinary field of microelectronics packaging and interconnection. The symposium, which is organised every two years in a different European country, combines both fundamental research and industrial applications and brings together specialists from industry and academia. The topics covered by the technical programme of the EMPS 2006 include all the important aspects of:

- **Materials & technologies**
- **Advanced packaging & MEMS**
- **Interconnection technologies & substrates**
- **Semiconductor structures and circuits**
- **Passive components, active devices & systems**
- **Electrical, thermal, mechanical and multi-physics simulations**
- **Microelectronic applications**
- **Quality & reliability**

Workshop

Prior to the symposium (May 21, 2006) a satellite Workshop on Ferroelectric Thin- & Thick-films Processing and Their Applications in MEMS will be organised by Jozef Stefan Institute in the frame of the Centre for Advanced Processing, Technologies and Materials for Ceramic Electro and Electromechanical Devices - SICER, (<http://dolomit.ijs.si/sicer>) at the same location. This is an excellent opportunity to take part in both events and to exchange your experiences with specialists in the field of ferroelectrics.

Contact:

EMPS 2006: info@emps2006.com

Workshop: barbara.malic@ijs.si

About (IMAP & MIDEM)

IMAPS, The International Microelectronics and Packaging Society is the largest non-profit society for companies and institutions dedicated to the advancement and growth of the use of microelectronics and electronic packaging.

Founded in 1967, IMAPS is the largest international microelectronics and electronic packaging society with professional members in 24 North American chapters and 19 international chapters. Members of the Society represent every discipline and specialty in the electronics industry and include both technical and marketing professionals. Currently IMAPS has more than 7,000 members in the United States and more than 4,000 international members around the world.

The aim of the Society is the advancement and worldwide spread of knowledge and commercial realisation of microelectronics - a key technology in the assembly and application of silicon chip semiconductors, film circuits and printed wiring boards to form practical, miniaturised electronic equipment.

Society membership is open to all individuals connected with microelectronics; there are no formal educational qualification entry requirements, but professional skills and experience are recognised through adjudication and election to Senior and Fellow of the Society.

Society for Microelectronics, Electronic Components and Materials, MIDEM, was founded in 1986 in Ljubljana, Slovenia. Although established locally, its membership base is international and includes professionals that work in the field of microelectronics, electronic components and materials.

Main activities of MIDEM society are:

- Organisation of International Conference on Microelectronics, Devices and Materials. Already 41st conference will take place in 2005, please see more on www.midem-drustvo.si/conf2005
- Publishing of scientific Journal of Microelectronics, Electronic components and Materials - Informacije MIDEM, ISSN 0352-9045.

MIDEM'06 - 42nd International Conference on Microelectronics, Devices and Materials, with joint Workshop on MEMS and NEMS, Sept 13-15, 2006, Slovenia

General Information:

Organizers welcome you to the 42nd International Conference on Microelectronics, Devices and Materials, MIDEM'06, together with the joint Workshop on MEMS and NEMS. This conference continues the tradition of annual international meetings organized by MIDEM - Society for Microelectronics, Devices and Materials, Ljubljana, Slovenia. These conferences have always attracted a large number of Slovenian and foreign experts working in mentioned fields as well as many distinguished invited speakers. Therefore, once a year scientists and engineers have the opportunity to present their activities and research results to a broad audience and to discuss new trends and problems related to their fields. The official Conference language is English.

The conference will be held in the beautiful sea side resort at the Slovenian Adriatic coast. Looking forward to meet you in Slovenia!

Organizer:

MIDEM - Society for Microelectronics, Electronic Components and Materials, Stegne 7, 1000 Ljubljana, SLOVENIA

Conference Sponsors:

Ministry of Education, Science and Technology of the Republic Slovenia

IMAPS, Slovenia Chapter

IEEE, Slovenia Section

MIDEM'06 Conference - Topics:

Novel monolithic and hybrid circuit processing techniques, New device and circuit design, Thin films, Thick films, Process&Device modelling, Semiconductor physics, Sensors, Electromechanical devices, Microsystems, Optoelectronics, Photovoltaic devices, New materials and applications, Materials science and technology, Materials&Devices Characterization, Reliability and failure analysis, Education in the field of microelectronics, devices and materials.

Workshop on MEMS and NEMS - Topics:

Basic effects, New devices, Design, Technologies, Characterization, Applications.

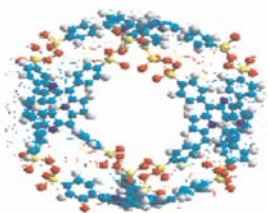
Deadlines:

Abstract: June, 10, 2006

Notification of acceptance: June, 30, 2006

Organised by:

MIDEM — Society for
Microelectronics, Electronic
Components and Materials —
IMAPS Slovenia Chapter
Stegne 7, SI-1000 Ljubljana
Slovenia
<http://www.midem-drustvo.si>



National RTD priorities programme
 “Functional materials and molecular mechanisms” 2003-2006.

Coordinator : Kaunas University of Technology (www.microsys.ktu.lt)
 Prof. Valentinas Snitka (vsnitka@ktu.lt)

The goal of the programme is to generate a new knowledge and to develop the specific key tools and materials for the nanostructuring of matter down to the molecular scale.

Research is oriented to the nanoscience of single molecules and molecular structures. Instrumentation, based on Scanning Probe Microscopy methods (AFM, STM, SNOM) was developed and set up to study placement and manipulation of molecular and mesoscopic structures on the inorganic and organic surfaces (cells), the growth and formation of novel nanotubules, nanowires and sieve like structures, the electrical and mechanical properties of macromolecular manufactured structures as a building blocks for nano-architecture.

The research efforts is focused on a self-assembly process for creating molecular and composite matrix nanostructures based on synthesis of porphyrins, sol-gel ferroelectric thin films and nanoporous glasses.

The engineering at the nanoscale is focused to the development of novel functional ferroelectric thin films by controlling their nanostructure, AFM based polarization nanolithography, mechanics of nanostructures with application to nanotribology and nanomanipulation, mechanics of biostructures and cells for diagnostics and drug delivery.

The important part of the programme is the dissemination of the newly generated knowledge of nanoscience through the education, conferences and technology transfer to the industry.

Program unites 7 research groups of Kaunas University of Technology, Vilnius University, University of Agriculture, University of Vytautas Magnus, Institute of Semiconductor Physics, 2 SMEs and consist of 16 scientists and 11 PhD students.

The instrumentation developed and set up at Research Center for Microsystems and Nanotechnology:



Scanning Near Field Optical microscope with photon counting and fluorescence imaging



Biological AFM combined with inverse optical microscope and possibilities for single cell manipulation.

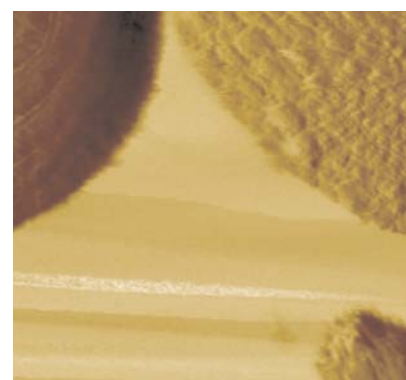
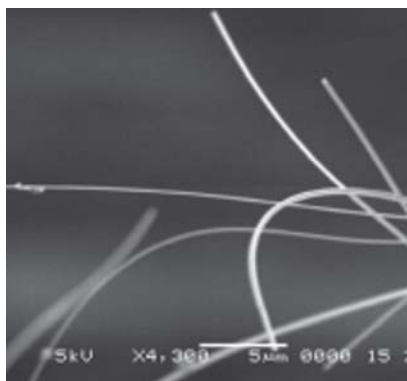


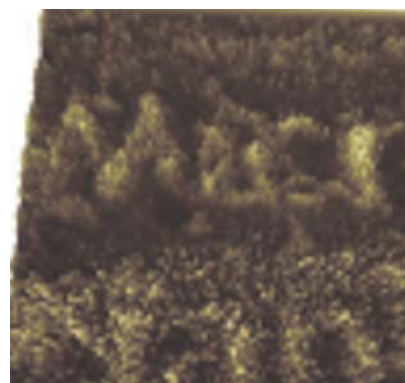
Image of red blood cells made in vitro



Carbon nanotubes growth in air by new catalytic method



Self-assembled porphyrin nanotubes



AFM nanolithography: Polarization-patterned PZT film with complex patterns of written words “micro, nano” (scan area: $1 \times 1 \mu^2$)

Contact: Prof. Valentinas Snitka, RC for Microsystems and nanotechnology, KTU,
 E-mail: vsnitka@ktu.lt

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MINOS-EURONET project (EC Contract No 015704)



International Laser Centre

Ilkovicova 3, 812 19 Bratislava, Slovak Republic
Tel.: +421 (2) 654 21 575 Fax: +421 (2) 654 23 244
E-mail: ilc@ilc.sk url: <http://www.ilc.sk>

The International Laser Centre (ILC) is an interdisciplinary organisation, focused on training, research and development in the areas of progressive methods and technologies of photonics, and their application in various fields and on various levels of national and international cooperation.

The mission of the ILC is to create local conditions for high level interdisciplinary and international scientific work in particular field of interest. The organisational culture is based on the following core values: high professionalism, interdisciplinary approach, sharing technology and ideas, international collaboration.

Main objectives of the ILC are:

- providing the platform for technology transfer and creating contacts among scientists, engineers and other specialists sharing interest in the field of photonics
- presentation of scientific and technical results, development of information network with a possibility of international multimedial connection to related institutions
- development and application of the high-class equipment for critical laser technologies
- stimulation scientific and technical cooperation, joint participation in the international scientific programs and grants
- solving of actual scientific and technological projects
- organisation of special education and training courses, as well as solving of research projects will be held in association with other institutions in Slovakia and other countries
- organisation of training and courses, co-ordination with universities in gradual and postgraduate education in the mentioned field of interest, training of the highly-qualified researchers and engineers based on the advanced learning technologies
- organisation of the international conferences, symposia and technical exhibitions
- consulting and information services, market and technology monitoring, preparing of a relation database in the fields of lasers and optoelectronics, optical diagnostics, related instrumentation and

software in co-operation with associated institutions

- photonics technologies for solid state science and material analysis
- industry oriented non-contact metrology, rapid prototyping
- photonics technologies for biomedicine
- computer visualisation and analysis of complex datasets
- technology transfer (local industrial partners, technical park for Universities)



Laboratory of Rapid Prototyping and Reverse Engineering

Laser stereolithograph LS 250 [NICTL Shatura] using LGK 30 He/Cd laser, filled with Renshape/Cibatool SL 5170 epoxy resin, default layer thickness 0.1 mm.

The International Laser Centre was established by the Ministry of Education of Slovak Republic in January 1997. The decision on the establishment was aiming to build up an excellent research centre with laboratories equipped with up-to-date technology in field of advanced laser and optoelectronic technologies. This will help Slovakia to create the optimal conditions for upgrade of education in the field at the universities, to grow active international co-operation, to accelerate and improve the preparation and requalification of specialists in field of advanced laser and optoelectronic technologies, stimulation of application the laser technique and technology, advanced optoelectronics and photonics in various areas of industry.

Department of Microelectronics, Faculty of Electrical Engineering and Information Technology, Bratislava

<http://www.kme.elf.stuba.sk/kme/>, Daniel.Donoval@stuba.sk

For 45 years from its foundation the MD FEI STU Bratislava has been accepted as the internationally acknowledge R&D center. The complex activities comprise microelectronics (IC design, new methodologies of testing), sensorics, optoelectronics with deep understanding of physics and technology of semiconductor structures, devices, high vacuum technology and analysis with a huge support of modeling and simulation.

The teachers and researchers of the department are contributing considerably to the educational process and its development by the implementation of new-knowledge in the curricula with microelectronics orientation in undergraduate, postgraduate and PhD study. Very important feature of the educational process is the frequent involvement of students in individual projects to solve some partial problems of research projects at the department. There are 18 teachers, more than 20 researchers and about 20 PhD students at the department. Among them there are 6 professors, 15 associated professors, 3 staff members have the DrSc. (Doctor of Science) degree and 29 have PhD. degree. This represents a large intellectual potential with relatively good laboratories and experimental set-up forming a very good environment for intensive participation of the department in R&D grants.

In the premises of the department there are complex laboratories for measurement of electrical characteristics and parameters extraction of semiconductor structures and devices using the I-V, I-T, C-V, C-t, DLTS, noise measurement and their modifications. Within the unique laboratories of the department may be included SEM with implemented EBIC and FREBIC modes, the laboratory of μ Raman spectrometry, AES and XPS. Some new physical models for simulation of electrical properties and characterization of the non-standard effects of metal-semiconductor interfaces were developed. 2/3D process and device simulations (ISE-TCAD) of electrical characteristics and parameters extraction of parasitic properties of selected structures with particular interest to power devices and smart power IC is frequently used. Benefiting from the participation of MD FEI STU in the EU supported project EUROPRACTICE the

staff members have access to the utilization of newest versions of desing and simulation tools CADENCE, SYNOPSIS and HSPICE for automated desing, simulation and verification of the properties of designed structures.

About 10 -11 research grants and 4-5 applied research projects supported by the Ministry of Education of Slovak Government, more than 10 research projects funded internationally, from them more then 6 supported by the EU and NATO are solved yearly at the department. The staff members published yearly about 30 papers in scientific journals and about 80-100 contributions in conference proceedings particularly international in English. The application of obtained results for the industrial exploitation is incresed and research grants were solved on contract bases with national and international comparnics in the year 2005.

In the last years two that the efficiency of R&D work has increased. Another positive aspect is high number of young experts – PhD students who together with the senior staff numbers guarantee the successful solution of complex advanced R&D tasks. The intensive collaboration with the MCL Bratislava, research institutes of SAV and international collaboration will allow to use the complementary methods and processes as well as the expertise of collaborating institutions for project solutions.

The MD FEI STU plays an important role in technology transfer towards the local industrial entities. Within the framework of the EU programs the department was established as the National Contract Point for Microelectronics and Signal Processing and National Contract Point for Sensorics and Microsystems technology. The department plays an active role in establishing the Nanoelectronics Centre and Network of Excellence in Slovakia and professors of the department represents Slovakia in European technology platforms ENIAC and EPOSS (Prof. Donoval) and PHOTONICS 21 (Prof. Uherek). The department staff members organized many workshops, seminars and training for representatives of the industry.

The publication of this page is supported by the **MINOS-EURONET** project (EC Contract No 015704)

Koç University-Optical Microsystems Laboratory

<http://mems.ku.edu.tr>

Assoc. Prof. Hakan Urey, Director of Optical Microsystems Laboratory

E-mail: hurey@ku.edu.tr

Optical Microsystems Laboratory (OML) was established in 2001 at Koç University-Istanbul (Turkey) and focuses on design, testing, and characterization of: MOEM (micro-opto-electro-mechanical) and MEMS devices and systems. Locally OML is a part of Koç University Optoelectronics Research Center. Externally OML has a wide array of sponsors from industry, national government and EC.

Ongoing research

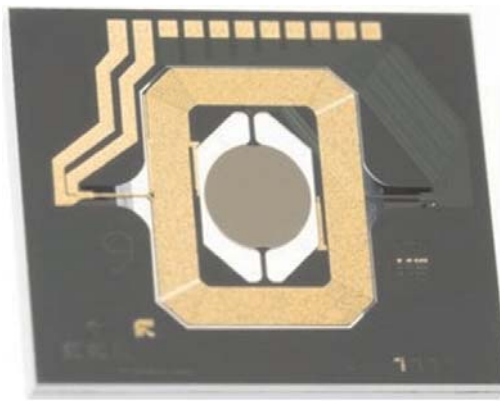
- Microscanners for display and imaging systems (funded by Microvision Inc. USA)
- MEMS spectrometer (in collaboration with Fraunhofer IPMS, Germany)
- MOEM infrared camera
- Microlens beam steering for imaging (partially funded by FP6-NEMO)
- Nanowires as biological sensors (funded by TÜBİTAK (Scientific and Technical Research Council of Turkey))
- Polymer magnetic actuators (partially funded by Microvision Inc. USA. and KÜMPER-MIGROS, Turkey)
- Auto-stereoscopic 3D displays (partially funded by FP6-3DTV)

Ongoing FP6-projects

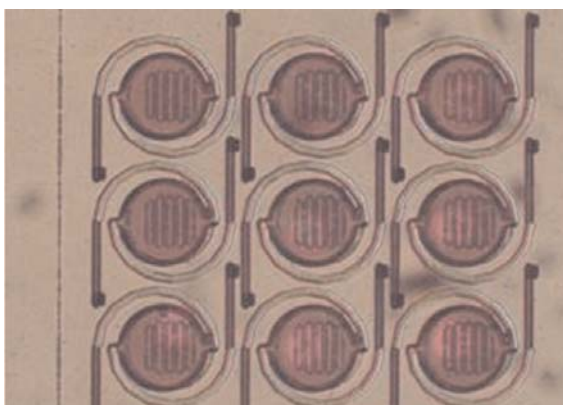
- EC Framework 6 Project MINOS– EURONET: “Networking in micro-nanosystems in Europe”.
- EC Framework 6 project Network of Excellence in Micro-Optics (NEMO). A networking platform for micro-optics in Europe with thirty partners.
- EC Framework 6 Network of Excellence 3DTV. A project for integration of all European research in all technical aspects of Three-Dimensional Television.



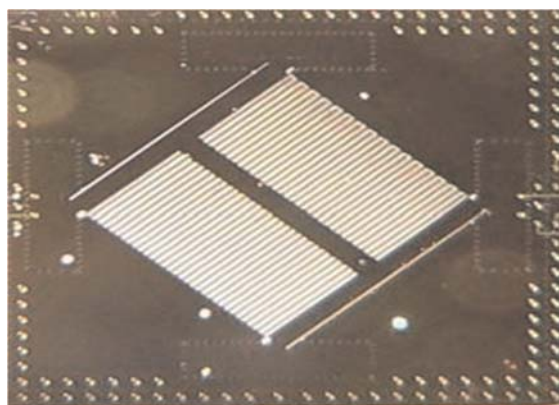
The OML group



2D MEMS Scanner



MOEM IR detectors



MEMS FT Spectrometer

Facilities

- Test and Design Laboratory: Has Optical, electrical and mechanical characterisation and inspection tools and equipment. Member of Europractice network. List of software in use: CADENCE, ANSYS-Multiphysics, FEMLAB, ZEMAX, MATLAB, SIMULINK, MATHEMATICA, LabView.
- Clean room (completed March 2006) so far has MA45 Mask Aligner (Karl Süss), Dektak 8 (Veeco) and resist spinner will give the opportunity to fabricate and characterise MEMS locally.
- Electroplating lab different metals and alloys are successfully plated for magnetically actuated scanners and other uses.

The publication of this page is supported by the
MINOS-EURONET project (EC Contract No 015704)



MANTARC Center of Excellence was established to carry out research in the area of design and fabrication of microelectronic, micromechanical and optoelectronic devices and integrated systems (MEMS/MOEMS), as well as to form the scientific and technical basis for the development of nanotechnology based on modern applications of silicon technology. Working on its goals **MANTARC Center of Excellence** conducts (according to the guidelines of the Government's policy of science) fundamental and applied research in the area of micro- and nano-technology, as well as participates in the organization of European Research Area. R&D activities are undertaken in co-operation with the leading Polish research centers.

The main tasks of the Center are as follows:

co-operation with universities and other research centers in Poland, European Union, and countries belonging to the European Research Region; support for multi-disciplinary research on the application of micro- and nano-technology, as well as support for the technical education.

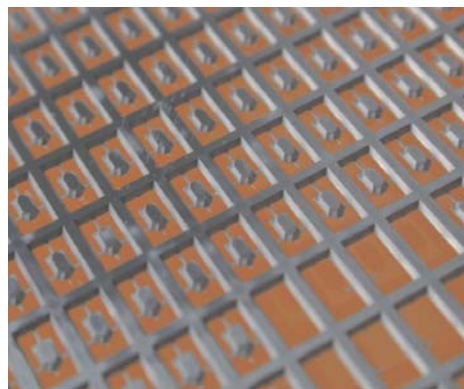


Photolithography Clean-Room

The Center's research and development area includes:

- design of analog and digital integrated circuits and systems, including ASIC's and systems-on-chip (SoC);
- design of the topography of functional blocks of IC's in the form of the so-called IP blocks;
- design and fabrication of silicon sensors of physical and chemical parameters;
- design and development of the fabrication process sequence for MEMS and MOEMS for interdisciplinary applications;
- fabrication of silicon micro- and nano-probes for AFM analysis of the surface;
- design and fabrication of photodetectors, including avalanche Si photodiodes;
- design and fabrication of silicon detectors of radiation;
- development of new electrical, photoelectric, SEM/TEM methods to characterize semiconductor structures;
- development and implementation of partial technologies.

MANTARC provides academic researchers and students with the access to semiconductor technologies (sensors, microsystems and integrated circuits). It provides a platform for development of IC prototypes in the form of multi-project wafers and contracting orders of the development of the fabrication process sequence and actual fabrication of non-standard micromechanical structures. The Center contributes to making the domains described above more attractive to students, improving the level of education in the area of micro- and nano-technology and creating new prospects for the development of experimental research.



Micromachined silicon microprobes

National Center of Silicon Micro- and Nano-Technology is an important part of **MANTARC** activities. Through this **MANTARC's** potential in the area of microsystem technology is available to Polish research community.

Superior qualifications of scientific staff, motivation, international contacts, wide scope of basic and market oriented applied research together with unique facilities and equipment resulted with many prestigious achievements. The most important results within the last years are as follows:

The scientific results of the research works were widely published in international scientific journals and presented at conferences. Since the year 2002, our research teams published 281 papers, 78 of which in journals selected by the Institute for Scientific Information, Philadelphia, USA;

The developed products have been awarded many nation-wide prizes and favors. The most important include: Economic Award of the President of the Republic of Poland for the best invention of the year, twice the 1-st category award of the Polish High Technical Association as well as the Polish Product of the Future award and medals on hi-tech fairs. Broad international co-operation with both scientific institutions and commercial enterprises confirms the European level of RTD activities of the Center.

MANTARC is a member of European initiatives as a competence center for microsystems fabrication offering access to advanced MOEMS technologies for industrial organizations.

The permanent staff of the Center consists of 53 scientists (2 full professors, 2 associate professors, 14 Ph.D.'s, 27 engineers and 8 assistants) and 26 technicians.

In the ITE, there exists an organizational basis for Ph.D. and D.Sc. oriented research and granting the scientific degrees. Also, ITE is authorized to confer PhD and D.Sc. Degrees. With this opportunity and with the experienced scientific staff of the Institute, there is a possibility of attracting Ph.D. students wishing to work in the scientific direction of the semiconductor microelectronics.

MANTARC - Micro- and Nano- Technology Applied Research Center

Piotr Dumania, Ph.D.

Institute of Electron Technology (ITE)

Al. Lotników 32/46

02 - 668 Warszawa, Poland

pdumania@ite.waw.pl

<http://www.6pr.pl/coe/midi/data/577.html>

The publication of this page is supported by the **MINOS-EURONET** project (EC Contract No 015704)



Specific Support Action from FP 6 (2004-2006): Micro and Nanotechnologies going to EASTern Europe through NETworking" (**MINAEAST-NET**)
Coordinator: National Institute for Research and Development in Microtechnologies, Romania



The Third MINAEAST-NET Workshop within the MINAEAST-NET EU project

The Third MINAEAST-NET Workshop took place in Villard-de-Lans, France, in the period 26-27 January 2006 and was organized by TIMA, France (Techniques of Informatics and Microelectronics for computer Architecture).

The workshop gave the possibility to strengthen the relationships between Western and European organisations that are active in MNT, including the dissemination of information about various projects, networks, local events in each organization / country participating in the MINAEAST-NET project.

The workshop was opened by Prof. Bernard Courtois from TIMA with a welcome speech for the participants, followed by presentations of Western networks, during the first day.

The first presentation was given by Dr. Patrick Boisseau from CEA, France, about the Nano2Life NoE (FP6 priority 3), which is also coordinating it. The presentation showed the main aims of the network, the partners' distribution, link with the ETP Nanomedicine, and future events to be organized by the network.

Mr. Patric Salomon, from 4M2C Patric Salomon GmbH, Berlin, Germany, presented NEXUS - the European Microsystems Association and its offer to ACC/NMS organisations, including results from the latest NEXUS Market Analysis. The PATENT NoE (FP6 priority 2), coordinated by Dr. Andrew Richardson, University of Lancaster, UK was also presented.

During the second day, presentations of TIMA and Eastern partners were given.

Prof. Bernard Courtois from TIMA, France, gave an overview of research groups and laboratories including current research topics, technologies, applications and projects and he also presented issues related to technology transfer and dissemination/education offer.

The Eastern partners presented the activity of represented organizations, national networks or projects in the MNT field, as well as offers for collaboration: "An overview of MNT works in Bulgarian Academy of Sciences and their coordination via MINAEAST-NET project" (Dr. S. Simeonov, ISSP, BG), "Nanoscience & Nanotechnology achievements in Bulgaria, educational programmes" (Dr. T. Pencheva, Univ. of Russe, BG), "International projects for research and development - Setting up a nanotechnology research laboratory in Miskolc, Hungary" (Prof. V. Timar-Horvath, BUTE, HU), "Review of activities in the sphere of nanotechnologies and nanomaterials in Slovakia" (Prof. S. Longauer, TUK, SK), "An overview on the work done in Slovenia on establishing MNT domain and related topics" (Prof. dr. S. Amon, Univ. of Ljubljana, SI), "Micro/nanotechnology networking in Poland" (Dr. J. Lysko, IET, PL), "Integrated Research Network Devoted to Nanobiotechnology for Health - Romanian Nanomedicine Network RO-NANOMED" (Eng. C. Roman, IMT, RO), "Micro and Nano Technologies at Sabanci University, Turkey" (Sabanci Univ., Turkey). Some scientific presentations were also given: "Review of activities in Central Laboratory of Mechatronics and Instrumentation, Bulgaria" (Dr. R. Krasteva, CLMI-BASc, BG), "Nanoimprint lithography. Principles and applications" (Prof. Dr. S. Tamulevicius, IPE-KTU, LT), "Quality control of the printed circuit board assemblies using ultrasound" (Dr. E. Jasiuniene, UI-KTU, LT), "Nanoscale diffusion phenomena" (Prof. I. Szabo, Debrecen Univ., HU). Dr. Carmen Moldovan (IMT, RO) presented the 4M NoE and the RAS center for Eastern Europe.

Participants from 9 different countries, including the MINAEAST-NET project partners, attended the workshop and several grants for Eastern participants were offered by MINAEAST-NET for participating in the event.

The presentations given at the workshop can be accessed on the project website, at the address <http://www.minaeast.net>.

New! A database for national/international networks in the MNT field is available on the project website, in the section MINAEAST offer / Databases, in addition to the other three previously launched databases (Databases for research centers, specialists and international projects). Free search can be performed within the databases by keywords, domain, priority, country.

All the databases are interactive and accessible free of charge after registration.

MINAEAST-NET project (contract no. 510470)

Micro and Nanotechnologies going to EASTern Europe through NETworking
 EU Contract no.: 510470 (SSA in FP 6)

Project coordinator: Prof. Dan Dascalu (dascalu@imt.ro),
 National Institute for R&D in Microtechnologies (IMT-Bucharest)

E-mail contact: net@imt.ro

Phone: +40-21-490.82.12 or +40-21- 490.84.12

Fax: +40-21-490.82.38 or +40-21- 90.85.82

Web page: www.minaeast.net



Participants attending the Third Minaeast-Net Workshop



For facilities offered by the **MINAEAST-NET** (including travel grants) see www.minaeast.net.

National Seminar of Nanoscience and Nanotechnology

The 5th edition of the National Seminar of Nanoscience and Nanotechnology was organized on 2nd of March by the Romanian Academy and the National University Research Council with the logistic support of the European project ROMNET-ERA (coordinator IMT Bucharest) 68 oral and poster presentation were sustained. The selection of papers was assured by 16 high profile scientists. As a result of the strong collaboration with the National University Research Council, 40 of the presentations had authors from universities. 155 scientists from universities (30%), national research institutes (36%), institutes of the Romanian Academy (14%) and other centers were present.

At this edition of the seminar, the "bio" component of the topics was increased. The most interesting presentation will be published further by the Romanian Academy.

Opening the seminar, Prof. Dan Dascalu presented "European perspective at "nano" scale". Most of the presentations were:

"Synthesis, characterization and properties of gold nanoparticles in colloidal aqueous solutions in the absence and in the presence of globular proteins. Auto-assembled gold nanostructures in thin films" from Babes-Bolyai University Cluj-Napoca, Faculty for Chemistry and Chemical Engineering,

"Some aspects concerning the use of magnetic nanofluids to obtain magnetizable nanocomposites" from National Center for Complex Fluids Systems Engineering "

"The study of self-assembled nanostructures by Atomic Force Microscopy" from Valahia University of Targoviste,

"Determination mod of magnetic characteristics and magnetic moment to the magnetic bacterium case study of the magnetospirillum gryphiswaldense" from INCIE CA

"HfO₂ thin films prepared by sol-gel method" from Institute of Physical Chemistry of the Romanian Academy

"Size dependent phenomena in nanoparticles: magnetic resonance detection" national R7D Institute of Isotopic and Molecular Technologies, Cluj

"Tunable surface-enhanced Raman scattering (SERS) from nanostructured noble metal films fabricated by nanosphere lithography" from Babes-Bolyai University Cluj-Napoca, Faculty of Physics and Institute for Experimental Interdisciplinarity Research

"ISFET micromachined sensors HfO₂ and Ta₂O₅ based" from IMT Bucharest

"Spin density calculation for electron acceptor-building blocks of molecular magnets" from Ovidius University Constanta

"Soft chemical synthesis of nanomaterials: challenges for technology transfer in electronic applications" from national R&D Institute for Non-ferrous and Rare Metals, Bucharest.

"PROmotion of Romanian competences for the European co-operation in micro-nano-BIOSYStems" PRO-BIOSYS

Coordinator: Prof. Dan Dascalu (dascalu@nano-link.net)

National Institute for R&D in Microtechnologies, IMT-Bucharest, Romania

PRO-BIOSYS intends to promote the Romanian competences, by intensifying the cooperation of the Romanian research organisations and private companies in the *micro-nano-biosystems domain* ("bio-chips") with the European research and industry area, with the main aim to increase the number of proposals with Romanian participation and the rate of success in FP7 of Romanian projects. The development of bio-chips has numerous implications for biology, medicine, toxicology, genetics, pharmacology, etc.

PRO-BIOSYS will stimulate the **formation of new collaborations and partnerships and is open to cooperate with other networks or projects in the field**. The project consortium is formed by four partners with complementary competences and equipment: two national institutes (one active in micro-nanotechnology and other in microbiology and immunology), a university and a private company (interested in biochip manufacturing).

■ National Institute for R&D in Microtechnologies (IMT-Bucharest), Contact person: Prof. Dan Dascalu (dascalu@imt.ro) –project coordinator

■ The National Research Institute for Microbiology and Immunology "Cantacuzino" Bucharest, Contact person: Dr. Nadia Bucurenci (nadiab@cantacuzino.ro)

■ Faculty of Biology, Biochemistry Department, University of Bucharest, Contact person: Prof.dr. Marieta Costache (Costache@bio.bio.unibuc.ro)

■ Dextercom SRL, Contact person: Lorand Savu (lorand_savu@yahoo.com)

The PRO-BIOSYS project is referring to a **field of great importance**, due to the progress brought by **micro and nanotechnologies** in creating new instruments for **studying the biological phenomena, medical applications, pharmacology, toxicology, food control, control of environment quality and, generally speaking, the quality of life**. These technologies may act at molecular level, with more adequate techniques for the living matter. In the same time, they offer technical intelligent, miniaturised, low consumption, cheap and reliable means for monitoring, diagnosis and intervention.

Objectives

1. **Developing the links between the existing Romanian scientific networks and consortia, on one side, and the European networks in the field, on the other side, in order to achieve direct contacts between research groups and to develop together co-operation proposals financed by the future FP7 and from other sources:**

- visits in Romania of foreign visitors (personalities with recognized activities in the field)
- national workshops, with international participation, as a tool for developing the links between Romanian scientific networks in the field, but also with European networks
- short documentation visits of Romanian researchers at foreign partners
- meetings on new projects (participation to meetings for preparing new proposals of international projects)

2. **Disseminating at European level the knowledge for research and technological development acquired in the frame of national programmes, including the transfer of knowledge and technology for possible co-operations with companies from the European Union:**

- participation or organization of international events and other initiatives for correlating the national programmes with the European themes and integration with the European technological platforms;
- disseminating electronically, through webpage, electronic publications and also printed materials.

3. **Extending some activities performed in common with European partners, by reciprocal visits and training stages:**

- training stages for personnel (training visits) at foreign partners
- organizing seminars during the visits in Romania of foreign partners

The chances of success of this project will be substantially increased by the creation of the **"PRO-BIOSYS network"**, containing besides the consortium members, also partners of the consortium as members in various running projects. In the **"PRO-BIOSYS network"** (with the partners having access to project results, information, contacts with foreign partners) private companies interested in the field are associated, in particular those which will be hosted by the Scientific and Technological Park in Micro and Nanotechnologies MINATECH-RO, coordinated by IMT-Bucharest, or will benefit from its services.

"Integrated Research Network Devoted to Nanobiotechnology for Health – Romanian Nanomedicine Network" RO-NANOMED
(<http://www.imt.ro/ro-nanomed>)

Coordinator: Prof. Dan Dascalu (dascalu@nano-link.net)

National Institute for R&D in Microtechnologies, IMT-Bucharest, Romania

As a national contact point for ETP Nanomedicine in Romania, IMT-Bucharest has initiated and created an **interest group – "Nanomedicine" Romania**.

Until April 2006, 101 participants (persons) are involved in this group: 33 participants from National R&D Institutes, 11 participants from R&D Institutes of the Romanian Academy, 5 participants from R&D Institutes, 36 participants from Universities, 10 participants from research centers and SMEs, 6 participants from Hospitals.

The interest group has a special section on the Ro-Nanomed website, restricted to the group, with information about various events and significant topics.



MINOS-EURONET
Micro-NanoSystems EUROpean Network
pursuing the integration of NMS and ACC in ERA
Project financed by European Commission (Contract No. 015704)
Web page: www.minos-euro.net
Contact: minos@nano-link.net



Coordinator: Prof. Dan Dascalu, Email: dascalu@imt.ro;
 National Institute for Research and Development in Microtechnologies, (IMT-Bucharest) www.imt.ro
New activities within MINOS-EURONET

Several activities have been developed during
March 2006:

A meeting with MINOS-EURONET project partners
 took place in Bruxelles, on March 20, 2006

The topics discussed during the meeting were related to the following issues: status of the project; main challenges of the first year; strategic focus: how to use MINOS-EURONET for preparation of participation to FP7; participation to the First MINOS-EURONET Forum in Bucharest; presentation of the Web-based magazine and the new databases. A plan for future events and visits was established during the project meeting and all the partners attending the meeting presented their possible offers. The consortium agreed the implementation of several rules regarding also project reporting.



MINOS-EURONET partners attending the project meeting in Bruxelles

Following the meeting, **an extranet protected webpage** was created, accessible for contact persons of MINOS-EURONET contractors only. This page is a convenient entry point for the e-Room space and the username and password for this web page are the same as for the e-Room. Several new databases have been implemented for:

- Info Events
- Scientific Events
- Educational and Training Events
- Papers published in scientific publications

All these new databases are completely open; the information can be seen immediately after.



The web-based magazine (WBM) was launched on the www.minos-euro.net/wbm webpage. This will be used for disseminating the most interesting information about competencies in NMS and ACC (people, organizations, achievements). Information from Eastern Europe will be focused on:

1. National programmes and initiatives
2. National infrastructures (e.g. networks, science parks)
3. Successful European cooperation (typically - participation in European projects)
4. Outstanding scientific results
5. National Centres of Excellence
6. Profiles (CV and photo of remarkable scientists, managers, project coordinators etc.

The main entries of this web-based magazine will be tightly correlated with the information in the electronic databases, therefore maximising the possible interaction with future partners. Contributions should be sent to wbm@nano-link.net.

Future events

The first MINOS-EURONET Strategy Forum "High technologies, innovation policy and regional development", focused on the impact of converging technologies, will take place on 18-19 May 2006 in Bucharest, Romania, at the Chamber of Commerce and Industry of Romania. Local organizers: Ministry of Education and Research in Romania, National University Research Council (CNCIS), Chamber of Commerce and Industry of Romania.

The first day will be devoted to regional and national policies and the second day of the Forum will be devoted to technologies and infrastructures for integrated micro-nano-bio-info systems and also applications of converging (mixing) technologies.

Further details and on-line registration will be available on <http://www.minos-euro.net>.

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4M events:

Business and Technology Challenges in Micro-Manufacturing, 11 April 2006, Cardiff, Wales, UK This workshop, jointly sponsored by 4M, is a one-day workshop for European industry and academia. More information at: <http://www.4m-net.org/node/1342>

PATENT DfMM events

Workshop on Design for Reliability and Manufacturability, 25 April, 2006, Lago Maggiore, Italy

Co-organised by PATENT-DfMM and the NEXUS Methodology Working Groups "Reliability & Test" and "Design Modelling Simulation". Main emphasis will be on reliability and test problems, where design methodologies can lead to significant improvements. Industry's design and reliability needs will be discussed and latest research results and new approaches will be proposed by the research community.

PATENT-DfMM is also organising a panel discussion at DTIP (27 Apr) on "Design for Reliability and Test of Microsystems" with key industry panellists.

Contact: Patric Salomon, 4M2C, Berlin, Germany, E-mail: Patric.salomon@4m2c.com; www.patent-dfmm.org

Technology Roadmapping for Packaging of MOEMS and RF MEMS

The first roadmapping PATENT DfMM event, hosted by HWU (16 Feb 06, Edinburgh), was a great success.

With more than half of the 30 participants coming from industry, technological trends, bottlenecks and investment opportunities in packaging of MOEMS and RF MEMS were collected and discussed in small working groups. The workshop was viewed as innovative and very useful by all participants and a lot of progress was made during this meeting. The transcription process into a roadmap format through the project team has begun. The second meeting will be held at the Fraunhofer IZM Berlin in Germany on 8 June 2006 – further active contributors are welcome to attend.

For more information please visit website: www.patent-dfmm.org

Contact: Fabien Holler, Heriot-Watt University, Edinburgh, UK; E-mail: f.holler@hw.ac.uk

AMICOM event

7th International Symposium on RF MEMS and RF Microsystems- MEMSWAVE, Orvieto, ITALY, on 27-30 June 2006 (<http://www.memswave2006.org/>). This event will provide an international forum for scientists and industrialists for the exchange of information on the most recent advances and best achievements in the area of RF MEMS with emphasis on European activities.

Main topics:

- Design and simulation tools (Electromagnetic, Mechanical, Thermal)
- Fabrication, process and materials
- Packaging, assembling, 3D integration
- Components and circuits
- Antennas
- MEMS and IC integration
- Reliability and testing
- Applications and system design

Nano2life Summer School on Methods in Micro - Nanotechnology and Nanobiotechnology, June 26- July 7, 2006, Athens, Greece (<http://www.imel.demokritos.gr/SummerSchool2006/index.htm>)

Organiser National Center for Scientific Research "Demokritos", in collaboration with the Foundation of Biomedical Research of the Academy of Athens, and Invited experts (lecturers) from other Nano2Life partners.

Important dates: Early bird registration: April 28th, 2006; Application deadline: 12 May 2006;

Contact points:

Dr Evangelos Gogolides, Institute of Microelectronics, NCSR Demokritos

Dr Irene Mavridis, Institute of Physical Chemistry, NCSR Demokritos

E-mail: PlasmaSupport@imel.demokritos.gr



Micro and NanoTechnology Bulletin is published quarterly by IMT-Bucharest, Romania (www.imt.ro). This Bulletin,

originally intended to publish **results of Romanian researchers in the micro and nanotechnology (MNT) field**, is extending its coverage since 2004 to Eastern Europe. The purpose is to contribute to a *better communication of MNT scientific communities from Eastern Europe to the rest of the world*. MNT Bulletin is distributed free of charge to interested organisations and individuals.

Editor-in-Chief: **Dan Dascalu (IMT-Bucharest)**.

The Bulletin is also available on the web page: www.imt.ro/mnt.

IMT-Bucharest is also the coordinator of three SSA projects (**MINOS-EURONET** and **MINAEAST-NET**) with support and dissemination activities through web pages, e-newsletter, flash news and online databases:

- Support through individual grants: www.minaeast.net;
- E-newsletters: **MINOS-EURONET** and **MINAEAST-NET** projects (common issue): <http://www.minaeast.net>;
- Flash news: **MINOS-EURONET** and **MINAEAST-NET** projects (common issue): <http://www.minaeast.net>;
- Online Databases: <http://www.minos-euro.net>

Coordinator of **MINOS-EURONET** and **MINAEAST-NET** projects: Prof. Dan Dascalu (dascalu@imt.ro).

Contact for FP6 projects: **MINOS-EURONET** (minos@nano-link.net), **MINAEAST-NET** (net@imt.ro)

Contributions and correspondence for MNT Bulletin may be sent to mnt@imt.ro.

