

Romania in the ETP Nanomedicine mirror group:
National contact point for the ETP NANOMEDICINE in Romania –
Prof. Dan Dascalu (dascalu@nano-link.net),
National Institute for R&D in Microtechnologies, IMT-Bucharest, Romania
<http://www.imt.ro>



Romanian organizations in ETP Nanomedicine:
<http://www.minatech.ro/nanomedicine>

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

Activities/projects: see the brochure "Micro- and Nanotechnologies for Bio-medical Applications" also on web at <http://www.imt.ro> and the next page of the present flyer

● **R&D National Institute for Nonferrous and Rare Metals, IMNR**

Activities/projects within the Nanostructured Materials Laboratory in IMNR (see more details on <http://www.minatech.ro/nanomedicine/members.htm>):

- Advanced Technologies for the synthesis and processing of biocompatible nanocomposite powders
- Integrated technology Research Network in advanced biocompatible structures for dental implants
- Integrated technologies for obtaining nanostructured biocomposites with applications in the regenerative medicine of bone tissue
- Hybrid nanostructured thin films for biosensors and biobanks
- Accreditation of a laboratory for chemical-physical characterisation of nano-bio-materials



Nanostructured biocomposites
 with applications in the regenerative medicine of bone tissue

● **National Institute for R&D in Electrical Engineering, INCIE ICPE-CA**

Activities/projects (see more details on <http://www.minatech.ro/nanomedicine/members.htm>):

- Magnetic nanogranular composite materials with applications in malignant tumors diagnostic
- Multifunctional advanced materials doped with silver nanoparticles models of bactericidal products

● **Institute of Physical Chemistry of the Romanian Academy.**

Activities within the Laboratory of Chemical Thermodynamics (see details on <http://www.minatech.ro/nanomedicine/members.htm>): characterization and investigation from the energetic point of view of the advanced materials involved in the complex modern systems and the new technologies

Other participants:

● **National Institute of Research and Development "Victor Babes"**

Activities/projects (see more details on <http://www.imt.ro/ro-nanomed/en/partners.htm>):

- Characterization and quantification of angiogenesis and proliferation in nanostructured polymer implants by immunohistochemistry
- Interactions of caveolin-1 and angiogenic markers – VEGF, bFGF – in human glioblastoma
- Immunohistochemical analysis of Apaf 1 (apoptotic protease activating factor 1) and catB (cathepsin B) correlated with apoptosis in pituitary adenomas
- In vitro testing immunomodulatory effects of natural extracts formulated as nanostructured glycerol-water compounds
- Innovative methods of photodynamic therapy with novel nanostructured photosensitizers

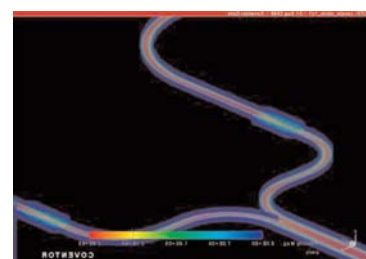
● **Institute of Biochemistry of the Romanian Academy** <http://www.biochim.ro/>

Bio-applications in FP6 projects (IMT-Bucharest):

"Development of a toxin screening multi-parameter on-line biochip system" –

ToxiChip; FP6 STREP, Priority 2 – IST

IMT role: development of a temperature sensor, as well as a pH sensor, that will be integrated with microfluidic platforms and development of a data acquisition system.



Microchannels simulations (fluid flow detail)

"Multi-domain platforms for integrated micro-nano technology systems - Service Action" – INTEGRAMplus; FP6

IP, Priority 2 – IST

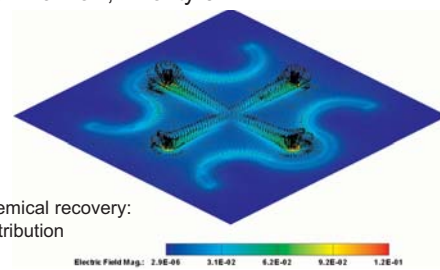
IMT role: prototyping and manufacturing access - IMT is in charge of providing access to biosensing and biointegration (microfluidics-based); design and virtual manufacture - IMT deals with modelling and simulation for MEMS, optical and microfluidic devices as well as Silicon-Polymer hybrid simulation; technology convergence and integration activities.

"Multi-Material Micro Manufacture: Technologies and Applications" – 4M ; FP6 NoE, Priority 3 – NMP.

IMT role: microfluidics for medicine.

"Lab-on-a-chip implementation of production processes for new molecular imaging agents" – Mi-Lab-On-Chip, STREP, Priority 3 – NMP.

IMT role: design and prototyping microfluidics components and chips; simulation of chip functionalities.



Simulation result of electrochemical recovery:
 Potential and electric field distribution

Electric Field Mag: 2.9E-06 3.1E-02 6.2E-02 9.2E-02 1.2E-01

Assistance for Romanian participation to ETP Nanomedicine
"Integrated Research Network Devoted to Nanobiotechnology for Health – Romanian
Nanomedicine Network RO-NANOMED", <http://www.imt.ro/ro-nanomed>
National Programme CEE

Coordinator: Prof. Dan Dascalu (dascalu@nano-link.net), IMT-Bucharest, Romania (<http://www.imt.ro>)

RO-NANOMED aims to create and develop an integrated research network in the field of nanobiotechnology for health and is targeting integration into the **ETP NANOMEDICINE**.

13 Romanian partners from 6 National R&D Institutes, 1 R&D Institute, 3 Institutes of the Romanian Academy, 2 Universities and 1 research center.

NANOBIOLAB

Is a laboratory used in common by all network partners. It has been developed in the 100-class clean room built at IMT-Bucharest and is devoted to technological research (new materials, structures, particles, devices etc.) involving biological materials.

Recent results:

Silicon micro-reservoirs:



Silicon micro-reservoirs array obtained with Microarray Scanner



Silicon micro-reservoir with fluoresceine molecule (plotted several times)

Enzyme-based sensors:



Enzyme based biosensor



Immobilized enzyme on gold electrodes

Research projects within RO-NANOMED

Cluster 1 - Regenerative Medicine:

- » "New advanced techniques from cellular biology to test the nanomaterials biocompatibility"
- » "New functional nano-implants for medical applications (dentistry, general surgery and ophthalmology)"
- » "Hybrid nanostructured materials for cell growth in biobanks"
- » "Nanostructures and nanosystems for bone implants"

Cluster 2 - Targeted drug delivery and release:

- » "Biological nanostructures used in drug release"
- » "Studies regarding new vectors/markers for controlled drug delivery systems"
- » "Development of new biomaterials for targeted drug delivery"
- » "Development of new hydrogels for medical applications"
- » "Nanostructured silicon for biomedical applications"

Cluster 3 - Nano-diagnostics:

- » "Multichannel probe for on-line registration of the electrical activity at cellular level"
- » "Development of new molecular markers for monitoring of cancer evolution"
- » "Magnetic biosensor for nano-diagnostics"
- » "Nano- and microfluidics as a bridge from diagnostics to medical treatment"
- » "Development of new semiconductive polysilans for biosensor applications"

Romanian Collaboration Platform for NANOMEDicine (RCP-NANOMED)

<http://www.minatech.ro/nanomedicine>

The platform includes 26 Romanian organizations interested in the domain: 9 National R&D Institutes, 1 R&D Institute, 4 Institutes of the Romanian Academy, 5 Universities, 2 research centers and 5 private companies.

RCP-Nanomed has the main objective to concentrate resources and correlate efforts at national level in order to develop the scientific and technologic nanomedicine domain, in close collaboration with the ETP Nanomedicine.

The RCP-NANOMED platform was launched on 4th of July 2006 in Bucharest, with support from European Commission and ETP Nanomedicine. Several foreign specialists from the nanomedicine domain attended the event and the working group of the platform was established.

The Workshop "Cooperating in FP7. Biomedical applications of micro- and nanotechnologies" was organized on 6th of December 2006, in Bucharest and several topics in the nanomedicine domain were presented with this occasion (7 presentations given by foreign participants).

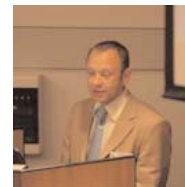
Collaboration between RO-NANOMED and the German NanoBiotechnology Network "NanoBioNet" is expressed by the presence of NanoBioNet representatives to both events mentioned above and the visit of Prof. Dan Dascalu to the NanoBioNet headquarters in Saarbrücken (May 2006).



Dr. Rer. Nat. Ute Steinfeld; KIST Europe Forschungsgesellschaft, Germany



Dr. Patrick Boisseau, CEA-LETI, Grenoble, France presenting the Strategic Agenda of Research of the ETP Nanomedicine



Dr. Mathias Mallmann, Science Park, Saarbrücken, Germany presenting NanoBioNet, a competence network in nanobiotechnology



Dr. Michael Loughran, Tyndall National Institute, Cork, Ireland



Prof. Dr. P. Laggner; Institut für Biophysik und Nanosystemforschung, Austria

From the Platform website (see above), databases with specialists, research centers and international projects in the domain can be accessed.