

## Nanoscience and nanotechnology in Romania

### Main research activities in nanomaterial/nanotechnology field in Romania

- Micro-nanotechnology for interacting, sensing, actuating and microsystems
- Nanobiotechnology
- Nanotechnology for applications in bio-medical field;
- Nanotechnology for information processing, storage and transmission
- Nanotechnology for materials and surface science;
- Nanotechnology for applications in chemistry;

### KEYWORDS

nanoelectrode arrays, low-frequency noise in nanostructured materials; porous silicon layers; field emission nanostructures; biofunctional nanostructures and interfaces; development of micro/nanostructures and microsystems dedicated to complex determination in vivo, in situ and in vitro of biological activity, with regard both to living systems and technological systems using biomimetic principles; nano(bio)technology for medical applications: drug encapsulation (encapsulation of hydrophilic and hydrophobic drugs in various colloidal drug delivery (liposomes, micelles, nanoparticles, micro emulsions); targeted drug delivery (obtaining targeted drug delivery systems for hydrophilic drugs); nano(bio)materials: nano and micro materials from natural non-toxic polymers (obtaining of nano and microstructured material with special properties for pharmaceutical, opto electronics, and other applications); biochips obtained with immobilized cyan bacteria on micro- and nano-electrodes; self-assembly: experimental and theoretical studies (self-assembling in colloidal systems as micelles, lyotropic liquid crystals, monolayers and multilayers at various interfaces); laser pyrolysis technique applied to the synthesis of nanopowders and thin films; carbon nanotubes (SWNT, MWNT, VGCF); 3-D nanoscale biomedical implants; nanostructured quasicrystals; nanocrystalline silicon; low-dimensionality magnetism and electronic structure; nanostructured materials by hydrothermal synthesis; composite nanofiltration; magnetic nanoparticles and smart nanomaterials with fluid properties : magnetic nanoparticle/magnetic (nano)fluid synthesis ; magnetizable polymeric nano/micro-composites (gels) and biocompatible/ bioactive composites; living cells on nanoporous silicon and hydroxyapatite – titan; metallic and semiconducting nanomaterials in aluminium oxide template; electroluminescent and molecular electronic devices

## RESEARCH INSTITUTES AND UNIVERSITIES INVOLVED IN NANOTECHNOLOGIES

### NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MICROTCHNOLOGIES (IMT-Bucharest)

**CENTRE OF NANOTECHNOLOGY.** Centre affiliated to the Romanian Academy (of Sciences) as a Centre of Excellence in Nanotechnologies; Head of the centre: Dr. Irina Kleps ([irinak@imt.ro](mailto:irinak@imt.ro)). **Research activity:** Theoretical studies and experimental technologies in nanomaterials and nanostructures, with main areas of expertise: silicon nanoelectrode arrays, low-frequency noise in nanostructured materials; porous silicon layers; field emission nanostructures; bio-functional nanostructures and interfaces.

### NATIONAL INSTITUTE FOR LASERS, PLASMA AND RADIATION PHYSICS

**LASER PHOTOCHEMISTRY LABORATORY (LPL).** Deputy General Director: Dr. Ion Morjan ([morjan@ifin.nipne.ro](mailto:morjan@ifin.nipne.ro)). Laser pyrolysis technique applied to the synthesis of nanopowders and thin films, produced by induced reactions in the gas phase/on a substrate. More recently, one of the **main research directions** of the LPL has been the preparation of carbon nanotubes produced by laser irradiation from the gas phase.

**LASER-SURFACE-PLASMA INTERACTIONS LABORATORY.** Laboratory head: Prof. Ioan N. Mihailescu ([mihailes@ifin.nipne.ro](mailto:mihailes@ifin.nipne.ro)). The research activity is focused on laser-synthesis and deposition of compound thin films of biocompatible and bioactive materials, refractory, piezoelectric, ferroelectric and optical coatings. Biomedical implants are 3-D nanoscale laser machined. The manufacture of biocompatible structures is aimed to substantially improve the quality of existing implants both in orthopaedic and dental surgery. Another purpose is to create new advanced functional materials able to trigger and control cells differentiation.

**ELEMENTARY PROCESSES IN PLASMA AND APPLICATIONS.** Laboratory head: Dr. C. P. Lungu ([lungu@infim.ro](mailto:lungu@infim.ro)). The group developed an original technology called Thermionic Vacuum Arc (TVA), suitable for nanostructured, multifunctional film preparation. Applications: DLC for MEMS; Tribological coatings; GMR films; High Temperature Resistant to Oxidation films. Diamond like carbon DLC coatings of MEMS devices enhanced field emitters by using ultrathin DLC top layers, high GMR effect. We are operating 3 vacuum equipments, using the original technology developed in our laboratory (TVA). We have a database in the field of TVA coatings using metals and dielectrics.

### **NATIONAL INSTITUTE FOR NON-FERROUS AND RARE METALS, RESEARCH GROUP FOR NANOCERAMIC MATERIALS**

Scientific Director: Dr. C. Gurgu ([cgurgu@imnr.ro](mailto:cgurgu@imnr.ro)), Laboratory Head: Dr. Radu Piticescu ([rpiticescu@imnr.ro](mailto:rpiticescu@imnr.ro)), Contact person: Dr. Roxana Mioara Piticescu ([roxana@imnr.ro](mailto:roxana@imnr.ro)). **Research activity:** wet chemical synthesis of nanocrystalline ceramic powders; development of chemical processes for thin/thick nanocrystalline ceramic films; processing of ceramic and composite powders; fundamental studies regarding mechanisms/kinetics of the processes and interfacial reactions in nanostructured materials.

### **NATIONAL INSTITUTE OF MATERIALS PHYSICS**

**LABORATORY OF LOW-DIMENSIONAL SYSTEMS.** Head of Laboratory: Dr. Magdalena Lidia Ciurea ([ciurea@alpha1.infim.ro](mailto:ciurea@alpha1.infim.ro)), Contact person: Dr. Cristian-Mihail Teodorescu ([teodorescu@alpha2.infim.ro](mailto:teodorescu@alpha2.infim.ro)). **Research activity:** surfaces and interfaces; nanostructured quasicrystals; metal-fullerene thin films; metal-semiconductor interfaces; oxide and nitride layers; nanocrystalline silicon; low-dimensionality magnetism and electronic structure. **Experimental facilities:** thin film growth; melt spinning alloy elaboration; x-ray diffraction; x-ray photoelectron spectroscopy; transport measurements; magneto-optical measurements; band structure calculations. Collaborative facilities: molecular beam epitaxy; CVD and PVD; EXAFS and XANES; high-resolution photoemission; x-ray absorption and x-ray magnetic dichroism; electron microscopy.

### **NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT OF ISOTOPIC AND MOLECULAR TECHNOLOGIES (Cluj-Napoca)**

General Manager: Dr. Mircea Bogdan ([mircea@L30.itim-cj.ro](mailto:mircea@L30.itim-cj.ro)) Contact person: Dr. Gheorghe Mihailescu ([gigim@ocl1.itim-cj.ro](mailto:gigim@ocl1.itim-cj.ro)). **Research activity:** preparation of metallic and semiconducting nanomaterials in aluminium oxide template production of nanocarbon by chemical vapour decomposition (SWNT, MWNT, VGCF).

### **NATIONAL INSTITUTE FOR CHEMICAL-PHARMACEUTICAL RESEARCH AND DEVELOPMENT,**

**PHARMACOLOGY DEPARTMENT, CENTER FOR CELLULAR AND MOLECULAR PHARMACOLOGY** General manager: Dr. Ing. Misu Moscovici ([iccf@ncpri.ro](mailto:iccf@ncpri.ro)), Contact person: Dr. Radu Albuiescu ([radu@ncpri.ro](mailto:radu@ncpri.ro)). **Research activity:** cell culture techniques for: cito- and genotoxicity studies used in drug research, in biomaterials and medical devices testing; biomedical applications: tissue engineering, studies of

signal transduction and biological responses at cellular and molecular level, interactions of cells with nanomaterials and nanostructured materials.

### **NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR TECHNICAL PHYSICS IASI**

General Director: Prof. Dr. Horia Chiriac ([hchiriac@phys-iasi.ro](mailto:hchiriac@phys-iasi.ro)). **Research activity:** theoretical and experimental studies on the nanostructured magnetic materials formation and their specific physical properties; investigation of magnetization processes and specific magnetic interactions within novel magnetic materials; design and fabrication of new devices based on new magnetic phenomena and novel magnetic materials.

### **NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN CRYOGENICS AND ISOTOPIC TECHNOLOGIES – ICSI RM. VALCEA**

General Manager: Prof. Dr. Ioan Stefanescu, Scientific Manager: Dr. Vasile Stanciu ([office@icsi.ro](mailto:office@icsi.ro)). **Research activity:** studies of the separation process of hydrogen isotopes; studies concerning cryogenic processes and specific equipments; separation and purification of gases; advanced materials; current production and technologies transfer.

### **NATIONAL INSTITUTE FOR ADVANCED RESEARCH IN ELECTRICAL ENGINEERING (SC ICPE-CA)**

#### **DEPARTMENT FOR MICRO AND NANO-STRUCTURED MATERIALS AND THEIR APPLICATIONS**

General Manager: Dr. Phys. Wilhelm Kappel ([kappel@icpe.ro](mailto:kappel@icpe.ro)). Contact person: Dr. Phys. Jenica Neamtu ([jenica\\_neamtu@icpe-ca.ro](mailto:jenica_neamtu@icpe-ca.ro)). **Research activity:** micro and nano-structured materials with new completely and different properties; magnetic multilayers nanometric structures; nanometric structures of Permalloy/Cu/Permalloy and Permalloy/Mo/Permalloy type, with application in magnetic microsensors; micro-granulated magnetic materials.

#### **MAGNETIC MATERIALS AND ELECTRICAL ENGINEERING APPLICATIONS DEPARTMENT.**

Contact person: Eng. Ion Ivan ([magnet@icpe-ca.ro](mailto:magnet@icpe-ca.ro)). **Research activity:** nanostructured composite magnetic materials of (Nd,Pr)FeB/a Fe for obtaining of permanent magnets.

**CERAMIC DEPARTMENT.** Contact person: Dr. Phys. Gheorghe Gavriliu ([gavriliu@icpe-ca.ro](mailto:gavriliu@icpe-ca.ro)). Research in nano-materials and nano-ceramics based on alumina and composite.

**CARBON MATERIALS LABORATORY.** Contact person: Phys. Ana Maria Bondar ([abondar@icpe-ca.ro](mailto:abondar@icpe-ca.ro)). **Research activity:** Designing and developing carbon multifunctional nano-composites based on mesophase pitch (MP) and nano-carbons (NC) additives. Controlling the ratio of the additives and heat treatment domain, can be designed a carbonic nano-composite material for absorption of electromagnetic waves, in a certain range of frequencies.

### **NATIONAL INSTITUTE FOR AEROSPACE RESEARCHES "ELIE CARAFOLI", Materials and Tribology Laboratory**

General Manager: Dr. Cornel Oprisiu ([coprisiu@aero.incas.ro](mailto:coprisiu@aero.incas.ro)); Head of Materials and Tribology Laboratory: Dr. eng. Victor Manoliu ([vmanoliu@yahoo.com](mailto:vmanoliu@yahoo.com)). **Research activity:** Nanocomposites epoxy-Montmorillonite; Carbon-carbon composites nano-ceramic matrix; Advanced micro-coatings with performant tribological and antithermic properties. **Facilities:** X-Ray diffraction instalation URD-6; JXA-microanalyser; Neophot microscope; Friction and wear instalation Tymken type; Four ball machine (tester) for lubricants testing; Instron instalation for mechanical testing (tensile strenght); Instalation hot-plane (300°C) for composites achievement; Thermal shock installation.

**THE MAGNETIC MATERIALS AND DEVICES (MMD) DEPARTMENT FROM THE NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR TECHNICAL PHYSICS (NIRDTP) IASI, ROMANIA**

Head of Department: Prof. Dr. Horia CHIRIAC ([hchiriac@phys-iasi.ro](mailto:hchiriac@phys-iasi.ro)). A wide variety of equipments for nanomaterials and nanostructured materials preparation and characterization are available at the department. **Research activity:** design and fabrication of new and innovative applications of such materials, especially novel sensing/actuating and biomedical applications.

**INSTITUTE OF PHYSICAL CHEMISTRY "I.G.MURGULESCU" OF THE ROMANIAN ACADEMY**

Director: Dr. M.V.Popa ([mvpopa@icf.ro](mailto:mvpopa@icf.ro)), Head of laboratory: Dr. Maria Zaharescu ([mzaharescu@icf.ro](mailto:mzaharescu@icf.ro)). **Research activity:** preparation of oxide and hybrid inorganic-organic nanomaterials and obtaining of carbon nanotubes by using of specific methods; development and optimisation of specific methods of characterization with application in the nano-material field modelling of phenomena and properties specific for nanomaterials.

**"PETRU PONI" INSTITUTE OF MACROMOLECULAR CHEMISTRY, IASI**

**POLYMER PHYSICS AND STRUCTURE DEPARTMENT.** Director: Prof. Dr. Bogdan C. Simionescu, Corresponding member of the Romanian Academy ([bcsimion@icmpp.tuiasi.ro](mailto:bcsimion@icmpp.tuiasi.ro)), Head of Department: Dr. Virgil Barboiu ([vbarboiu@icmpp.tuiasi.ro](mailto:vbarboiu@icmpp.tuiasi.ro)), Contact person: Dr. Daniel Timpu ([dtimpu@icmpp.tuiasi.ro](mailto:dtimpu@icmpp.tuiasi.ro)). **Research activity:** CVD procedure to obtain transparent layers of photo-conducting azopolymers with controlled thickness of 50, 500 nm; exploration of opto-electrical properties of the films in normal and doped states for application in opto-electrical traducers, xerography, electroluminiscent and other molecular electronic devices.

**INSTITUTE OF BIOCHEMISTRY OF THE ROMANIAN ACADEMY**

**MOLECULAR GLYCOBIOLOGY LABORATORY** Director: Dr. Stefana Petrescu ([Stefana.Petrescu@biochim.ro](mailto:Stefana.Petrescu@biochim.ro)), Deputy Director: Dr. Anca Roseanu ([roseanu@biochim.ro](mailto:roseanu@biochim.ro)). **Research activity:** The Laboratory is currently involved in the development of biotechnologies destined to cultivate living cells on nanoporous silicon and hydroxyapatite -titan. Visualization of adherent cells grown on nanomaterials by immunofluorescence microscopy.

**INSTITUTE OF BIOLOGY OF THE ROMANIAN ACADEMY, CENTER OF MICROBIOLOGY**

Head of the Centre: Dr. Lucia Dumitru ([lucia.dumitru@ibiol.ro](mailto:lucia.dumitru@ibiol.ro)), Contact person: Dr. Ioan Ardelean ([ioan.ardelean@ibiol.ro](mailto:ioan.ardelean@ibiol.ro)). **Research activity:** Biochips obtained with immobilized cyan bacteria on micro- and nano-electrodes, for environment monitoring; biomolecules (isolation and purification).

**CONDENSED MATTER RESEARCH INSTITUTE TIMISOARA (CMRIT), DEPARTMENT OF THE NATIONAL RESEARCH INSTITUTE FOR ELECTROCHEMISTRY AND CONDENSED MATTER**

Director: Ioan Grozescu ([grozescu@icmct.uvt.ro](mailto:grozescu@icmct.uvt.ro)). **The research activity** consists in the elaboration of installations and methods for obtaining of micro or nanocrystalline materials, thin films which have applications in optical, optoelectronic, phonon domains by RF inductive coupled plasma method, hydro and solvothermal at high pressures, sol-gel method, thermal evaporation method and the study of their characteristics and physics properties. Results have been obtained in nanostructured materials synthesis, materialized in products and techniques of hydrothermal, solvothermal, colloidal and radiofrequency plasma synthesis, disposing of proper equipment.

### **RESEARCH CENTRE FOR MACROMOLECULAR MATERIALS AND MEMBRANES**

Managing Director: Eng. Marin Radu, Contact person: Dr. Gabriel Bujor Albu ([macromol@rnc.ro](mailto:macromol@rnc.ro)). **The main research topics in nanoscience & nanotechnology** are: composite nanofiltration and prevaporation membranes obtained by plasma and/or interfacial polymerization (cooperation with INFLPR Bucharest); composite membranes obtained by the laser ablation deposition of *nanoparticles* on ceramic supports (cooperation with INFLPR Bucharest).

### **LABORATORY OF MAGNETIC FLUIDS (LMF), CENTRE FOR FUNDAMENTAL AND ADVANCED TECHNICAL RESEARCH (CFATR), ROMANIAN ACADEMY-TIMISOARA BRANCH (RA-TB)**

Contact person: Dr. Ladislau Vekas, head of the Lab. MF ([vekas@flumag2.mec.utt.ro](mailto:vekas@flumag2.mec.utt.ro)). **Research activity:** Magnetic nanoparticles and magnetizable complex fluids –smart nanomaterials with fluid properties: magnetic nanoparticle/magnetic (nano)fluid synthesis; magnetizable emulsions, magnetizable polymeric nano/micro-composites (gels) and biocompatible/ bioactive composites, magnetorheological fluids; theoretical modelling and numerical simulation of magnetic fluid properties; applications.

### **NATIONAL CENTRE FOR ENGINEERING OF SYSTEMS WITH COMPLEX FLUIDS (NCESF)- UNIVERSITY POLITEHNICA TIMISOARA (UPT)**

Director of NCESF: Ass. Prof. Dr. Eng. Romeo Susan-Resiga, Contact person: Ass. Prof. Dr. Eng. Floriana D. Stoian ([dstoian@mec.utt.ro](mailto:dstoian@mec.utt.ro)). **Research activity:** Complex characterization of magnetizable (nano)fluids and composites; magnetic fluids as cooling agents; properties of polymeric (nano)magnetic composites; molecular simulations of fluids; applications.

### **UNIVERSITY "DUNAREA DE JOS" OF GALATI**

**RESEARCH CENTER ENGINEERING SCIENCE AND TECHNOLOGY - MANUFACTURING SCIENCE AND ENGINEERING DEPARTMENT.** Contact person: Dr. Mihaela BANU ([Mihaela.BANU@ugal.ro](mailto:Mihaela.BANU@ugal.ro)). **Research activity:** oriented on introducing nanotechnologies and nanomaterials in the curricula of the engineering preparation. We proposed national contracts with the subject of nanomeasurements of the superficial layers obtained by manufacturing processes. Our intention is to develop some equipment for obtaining nanostructured materials by severe plastic deformation.

**THE MACHINE ELEMENTS & TRIBOLOGY DEPARTMENT.** Vice-Dean: Prof. Gabriel ANDREI ([Gabriel.Andrei@ugal.ro](mailto:Gabriel.Andrei@ugal.ro)). **Research activity:** mechanical and tribological testing of composites including magnetic lightweight materials, synthesis and analysis of non-standard gears made up from nano-structured polymeric composites and CAD/CAM technology. **Facilities:** 5 tribological testing machines and an X-ray diffractometer

### **UNIVERSITY OF BUCHAREST, FACULTY OF PHYSICS**

**THERMAL PHYSICS DEPARTMENT.** Dean of the Faculty of Physics: Prof. Dr. Antohe Stefan, Contact person: Associate Professor Valeriu M. Filip ([filip@digitalnet.ro](mailto:filip@digitalnet.ro)). **Research activity:** Applied theoretical studies in electron field emission from solid/composite surfaces: modeling of the electron field emission from carbon nanotubes and from carbon nanotube films.

**THE LABORATORY OF ATOMS AND MOLECULES.** Contact person: Associated Professor Mircea Bercu ([mbercu@Olimp.fiz.infim.ro](mailto:mbercu@Olimp.fiz.infim.ro)). **Research activity:** Characterisation of LPCVD Thin Layers Deposited on Si Based

On Optical Spectroscopy; Characterisation on implanted Si/SiO<sub>2</sub> structures and nanoporous Si reached in absorbed molecular species by using FT-IR; UV-Vis and EPR.

**FACULTY OF CHEMISTRY, PHYSICAL CHEMISTRY DEPARTMENT, RESEARCH CENTRE FOR APPLIED AND THEORETICAL PHYSICAL CHEMISTRY.** Head of the Centre: Prof. Mihaela Olteanu ([oltmi@gw-chimie.math.unibuc.ro](mailto:oltmi@gw-chimie.math.unibuc.ro), [oltmi@hotmail.com](mailto:oltmi@hotmail.com)). **Research activity:** Nano(bio)technology for medical applications: Drug encapsulation; Targeted drug delivery; Nano(bio)materials: Nano and micro materials from natural non-toxic polymers; Self-assembly: experimental and theoretical studies.

**FACULTY OF BIOLOGY, MOLECULAR BIOLOGY CENTRE (MBC).** Dean of the Faculty of Biology: Prof. Calin Tesio ([tesio@bio.bio.unibuc.ro](mailto:tesio@bio.bio.unibuc.ro)), Centre Director: Assoc. Prof. Marieta Costache ([costache@bio.bio.unibuc.ro](mailto:costache@bio.bio.unibuc.ro)). MBC is a multi-user research centre that offers excellent **facilities** for co-operation with national and international universities and research institutes. MBC include seven laboratories in the field of: molecular biology, cell culture, biochemistry, cellular biology, biotechnology and nanobiotechnology.

### **"AL.I.CUZA" UNIVERSITY OF IASI, DEPARTMENT OF SOLID STATE PHYSICS, FACULTY OF PHYSICS,**

**LABORATORY FOR PHYSICS OF THIN FILMS** Dept. Head: Prof. Dr. Mihaela Rusu, Laboratory Head: Prof. Dr. Nicolae Sulitanu ([sulitanu@uaic.ro](mailto:sulitanu@uaic.ro)). **Research activity:** inorganic and organic semiconducting thin films-fundamentals and applications; nanostructured magnetic materials-advanced applications.

### **UNIVERSITY OVIDIUS CONSTANTA, FACULTY OF PHYSICS, CHEMISTRY AND PETROLEUM TECHNOLOGY, INTERDISCIPLINARY RESEARCH CENTER ON MICRO- AND NANOSTRUCTURES**

Director: Associated Professor Dr. Victor Ciupina ([vcidupina@univ-ovidius.ro](mailto:vcidupina@univ-ovidius.ro)). **Research activity:** condensed matter either nanostructured (thin films, multilayer structures, materials obtained by crystal structure engineering) or microstructured (biological systems and electro-thermo-energetical systems). The main experimental techniques used consist of electron microscopy, optical microscopy, galvanomagnetic examination, vacuum deposition, plasma deposition, electrochemical etching, acoustic microscopy, etc.

## **FACILITIES. NETWORKS.**

### **FACILITIES**

The existing facilities are dispersed among research institutes and research groups in universities. Attempts to group them in networks (virtual centers) are mentioned below. The capability of a few centers will be reinforced by EU projects.

### **NANOTECHNOLOGY NETWORKS IN ROMANIA**

The National R&D Program "New Materials, Micro and Nanotechnologies – MATNANTECH" is funding national research networks, networks of laboratories with complementary facilities (all providing training by research), networks of centers of excellence ("virtual" centers of excellence). These nanotechnology **networks** (coordinated by IMT-Bucharest) are: BIONANONET - Bionanotechnology network; MINAMAT-NET - Characterization of Materials and Structures for Micro and Nanonengineering; NANOTECHNET - Network of Research Laboratories in Nanotechnologies; 3N - Consulting Centre in Nanomaterials, Nanostructured and Nanotechnology; CENOBITE - Centre for Researches in Nanobiotechnologies; NANOMATFAB – Virtual centre of research in nanomaterials and new production processes.

## **Education. Databases**

### **EDUCATION**

Training by research was provided by the networks quoted above. M.Sc. courses in nanosciences/nanotechnologies are envisaged by the University of Bucharest, University "Politehnica" of Bucharest, University "Al. I. Cuza" Iasi etc. Training by research in nanotechnologies is also facilitated by a number of European projects (especially networks of excellence) and bilateral agreements. A working group in "nanoeducation" was set-up at the national level on 10th of May, 2005. This group will interact also with the International Working Group initiated by NSF.

### **DATABASES**

- Databases related to research institutions and equipments related to nanotechnologies have been created during the strategy project related to "New Materials, Micro and Nanotechnologies" field, coordinated by IMT-Bucharest.
- New databases for researchers and research centers / groups /laboratories have been created in the ROMNET-ERA project financed by EU (and coordinated by IMT-Bucharest). More than 50 Romanian centers are grouped in the ROMNET-NANO network. The above databases are open to any qualified individual ([www.nano-link.net](http://www.nano-link.net)).
- The same databases are used not only for Romania, but also for Eastern Europe in general (this activity is supported by the MINAEAST-NET European project, also coordinated by IMT).

### **IMT-Bucharest is involved in FP6 Projects related to the "nano" domain**

- ❑ NANOFUN-POLY "*Nanostructured and Multi-Functional Polymer-Based Materials and Nanocomposites*", coordinated by Italian Consortium for Science and Technology of Materials (INSTM); contact person for IMT: Dr. Irina Kleps, [irinak@imt.ro](mailto:irinak@imt.ro)
- ❑ PATENT "*Design for Micro & Nano Manufacture*", [www.patent-dfmm.org](http://www.patent-dfmm.org), coordinated by University of Lancaster, UK; contact persons for IMT: Acad Dan Dascalu, [dascalu@imt.ro](mailto:dascalu@imt.ro)
- ❑ 4M "*Multi-Material Micro Manufacture: Technologies and Applications*", [www.4m-net.org](http://www.4m-net.org), coordinated by Cardiff University; contact person for IMT-Bucharest: Dr. Carmen Moldovan, [cmoldovan@imt.ro](mailto:cmoldovan@imt.ro)
- ❑ NANO2LIFE "*A network for bringing NANOTEchnologies TO LIFE*", [www.nano2life.org](http://www.nano2life.org), coordinated by CEA France; contact person for IMT: contact person IMT-Bucharest, Prof. Dan Dascalu, [dascalu@imt.ro](mailto:dascalu@imt.ro)
- ❑ ASSEMIC "*Advanced assembly and handling in microtechnology*", [www.asemic.net](http://www.asemic.net), coordinated by TU Wien, contact person for IMT-Bucharest: Dr. Raluca Muller, [ralucam@imt.ro](mailto:ralucam@imt.ro)
- ❑ Lab-on a Chip "*Lab-On-A-Chip Implementation of Production Processes for New Molecular Imaging Agents*", contact person for IMT: Acad. Dan Dascalu, [dascalu@imt.ro](mailto:dascalu@imt.ro).
- ❑ ROMNET-ERA "*ROManian Inventory and NETworking for Integration in ERA*", [www.romnet.net](http://www.romnet.net), coordinated by IMT-Bucharest, Acad. Dan Dascalu, [dascalu@imt.ro](mailto:dascalu@imt.ro)
- ❑ MINAEAST-NET "*Micro and NANotechnologies going to EASTern Europe through NETworking*", [www.minaeast.net](http://www.minaeast.net), coordinated by IMT-Bucharest, Acad. Dan Dascalu, [dascalu@imt.ro](mailto:dascalu@imt.ro)
- ❑ MINOS-EURONET "*Micro- and NanOSystems EUROpean NETwork pursuing the integration of NMS and ACC in ERA*", coordinated by IMT-Bucharest, Acad. Dan Dascalu, [dascalu@imt.ro](mailto:dascalu@imt.ro)