

## European Projects



One of the explicit goal of this International Meeting is promoting contacts amongst researchers and research groups for the creation of Multinational Thematic Networks, as well as promoting the future presentation of collaborative joint projects within some of the EU Operational Programs and Initiatives (for example, the just launched Sixth Framework Program). Presentation of results of already executed or under development European Projects are therefore highly encouraged, specially in the case of Interdisciplinary projects. Also proposals for future EU projects are welcome. More details on the format of these projects presentation/proposals will be given soon, but please do not hesitate to contact us if you have any suggestion for this Conference feature.

If you want to be included in the "Scientific/Tecnological Offer for Collaborative Projects" publication to be distributed at the beginning of the Conference, please download the following form and send it to the Conference Secretariat at [secretariat@formatex.org](mailto:secretariat@formatex.org) before September 24th, 2003.

### COLLABORATION OFFER/REQUEST

#### Submitted "Call for Partners" Proposals

##### · **Quantum Media with Dynamically Reversible Instability of Band Structure**

In the project there will be performed theoretical modeling and experimental development of quantum media based on metal containing carbonic composites which are nano-structured during self-organization. The will be developed method control of parameters of quantum charge transport using dynamically reversible instability of structure with the change of the state of spin polarization.

Contact person: *Dr. Halina Grushevskaya, Belarusian State University, Physics Faculty*

##### · **Nanosctured Molecular Biosensors for Immunochemical Reactions**

In the project there will be developed and investigated molecular biomedical sensor and control systems based on biologically active structures (antibodies, antigenes) and multi-channel physical and chemical information transformers using nanostructured porous Al and Si oxides and Langmuir-Blodgett films. The appropriate systems will be used for applications of intellectual control systems in immunology and microbiology.

Contact person: **Dr. Marina Voinova**, Department of Applied Physics , Chalmers University of Technology, 412 96 Göteborg, SWEDEN

• **Dynamics of Soft and Biomolecular Interfaces: Biosensors and Bioelectronics' Applications**

Our research covers the interdisciplinary fields of Molecular Bioelectronics (theoretical studies of electronic transport in biomolecular switches based on redox enzymes, SAM, lipid bilayers and photosensitive BLFs) and Biosensors (theory of SAW and QCM acoustic sensors with biological applications). We are interested in collaboration with experimental groups doing research in the field of Biosensors and Bioelectronics, and in the applications of Intelligent Materials (functional materials for drug delivery, lipid bilayer membranes, novel materials for bioelectronics and optobioelectronics based on supported/tethered polymeric, lipid- and reconstituted membranes).

Contact person: Dr. Marina Voinova, Department of Applied Physics, Chalmers University of Technology, 412 96 Göteborg, SWEDEN

• **Non-destructive Tomographic Methods in Environmental Science: Basic Research, Innovative Laboratory Methods and Extensions to Field Experiments**

Contact Person: Prof. Nikolaus Nestle, Institute of solid state physics, TU Darmstadt, Hochschulstraße 6, D-64298 Darmstadt, GERMANY

• **Solid Oxide Fuel Cells**

Powder Synthesis and Sintering. GNP method was modified to proceed smoothly and give very fine powders with precise stoichiometry. Powders synthesized are of perovskite and fluorite types intended for studying electrolytes for SOFC. Sintering temperatures are considerably lower than usual. Microstructure and properties will be studied

Contact person: Dr. Snezana Boskovic, Institute of Nuclear Science Vinca, Materials Science Laboratory, POB 522, 11001 Belgrade, Serbia and Montenegro

• **Development of Useful Applications of the Drying Drop's Dynamics Technology (DDD-Tech)**

We would like to find Partners, who are interesting in DDD-Tech to develop it together in different fields, such as medical diagnostics or food and drug testing, or some other

Contact person: Dr. Tatiana Yakhno, Institute of Applied Physics of Russian Academy of Sciences

• **X-Ray Standing-Wave Analysis of the Surface Structure of Semiconductor Heterostructures**

Aim of the proposal is a surface investigation of the system-on-a-chip or single-chip by the method of the X-ray backdiffraction in the conditions of total reflection.

Contact person: Dr. Hakob P. BEZIRGANYAN, Faculty of Physics, Yerevan State University, Armenia

• **Data Readout from the Semiconductor Storage Media using the Grazing-Angle Incidence X-Ray Backdiffraction (GIXB) Technique; Miniaturization of the digital information carriers used in optical data handling requires a readout device operating on a nanometer or even angstrom wavelength radiation.**

Contact person: Dr. Hakob P. BEZIRGANYAN, Faculty of Physics, Yerevan State University, Armenia

• **Air Quality Studies in Urban Areas**

The proposed research will substantially improve our ability of establishing source-receptor relationship with the goal for finding effective solutions to air quality problems and for a sustainable development in the urban area. Resulted from the field studies, laboratory experiments and application of transport model, reliable databases will be formed on the processes of emission, transformation, dispersion and deposition of particles of different origin, chemical composition and size. Impact of urban areas to regional air pollution will be evaluated, too.

Contact person: Dr. Mirjana Tasic, Institute of Physics, Environmental Physics Laboratory, Pregrevica 118, 11080 Belgrade, Serbia and Montenegro

• **Computer simulations and SIMS study of toxic substances accumulation in aerosol particles**

For deep understanding of dangerous influence of aerosol particles upon living tissue a detail information about toxic chemical spatial distribution both inside and on the surface of the particle is important, together with size distribution of the particles themselves. A preliminary version of software was developed for computer modeling of kinetics of accumulation of toxic chemicals on the surface and in the bulk of aerosol particles. Under simulations the formation of the particles as well as further migration and drift of them in atmosphere have been taken into account. We have preliminary experiments (SIMS, LMS, TPD MS etc.) on natural and artificially prepared aerosols and a good qualitative accordance with the theory is observed. For further research and development we need in collaboration with physicians and in financial support.

Contact person: Dr P.I. Didenko, Institute of Environmental Geochemistry NAS of Ukraine, Kiev, Ukraine

· **Extreme UV sources for photolithography and nanotechnology**

Fast discharge plasma, which is adiabatically expanded in vacuum, produces uv radiation. The plasma recombination produce radiation originated either from the excited dimmers of the gas used or the highly excited atomic or ionic states of the gas and the discharge material. Glass or ceramic nozzles or capillary discharges were used to provide radiation in the extreme uv region. The aim is to produce lasers or compact lamps for the needs of the photolithography and nanotechnology.

Contact person: **Prof. Tom Efthimiopoulos**, Physics Department, University of Crete, Laser physics lab. , Heraklion, Crete 71003

· **First-principles calculations of electronic structure of solids**

I would like to collaborate within the projects related to first-principles calculations. I use the Petot code developed at the National Renewable Energy Lab (USA), which uses the planewave pseudopotential method and SIESTA code, which uses LCAO-LDA approaches and can perform band structure calculations using the code VASP. Also, I can take part in investigation of the impurity photovoltaic effect and other theoretical studies related to third-generation photovoltaics

Contact person: **Dr. Smagul Zh. Karazhanov**, Physical-Technical Institute, 2B Mavlyanov St., Tashkent, 700084, Uzbekistan.

· **The receiving of high temperature superconductivity in semiconductors**

On the base of our previous results (Vikhlij G. A. at.al Superconductivity in InSb.- // Soviet Phys. Sem.- 1972, V.6, p.400 and other our works) and the last works: About manifestation of High Temperature Superconductivity Features in p-type CdTe. Khivrych V.I. et.al , Ukrainian Journal of Physics, 2003, V.48, no 3; Mini-Max symmetry and coulomb cooper pairing in HTSC hybrid ground state. Karpenko A. Ya. Program of New3 SC-4, 2003, San Diego, USA ) we propose futher experimental research on the base of compound semiconductors with the special surface treatment and different growing methods of monocrystals and irradiation of alpha -parycles and so on. The aim is the possibility to receive room temperature superconductivity. Collaboration with foreign partners and especially financial support are desirable.

Contact person: **Dr. Volodymyr Khivrych**, Institute for Nuclear Research and Institute for Semiconductors Physics National Academy of Science of Ukraine

· **Optical enzyme sensors based on silicon nitride planar waveguide and composite polyelectrolyte coating**

In the currect project we propose to carry on further investigation of different enzyme and inhibition reactions using both single sensor and the sensor array approaches and to develop a series of novel portable devices with the light source, waveguide, photodetector and pre-amplifier assembled on one chip

Contact person: **Dr. Alexei Nabok**, Senior Reserach Fellow , Sheffield Hallam University, School of Engineering, UK

· **Nanophase oxide films and nanocomposite polymer electrolytes (Project is a part of CA FERRONANOTECH in FP6)**

In the frame of Priority thematic areas of research in FP6 and particularly area 1.1.3 Nanotechnologies and nanosciences, knowledge-based multifunctional materials and new production processes and devices, the project supposes both intensive work in experimental and theoretical investigations in solid state physics and chemistry with the following scientific subjects:

- preparation and characterisation of nanophased oxide films (nano-films)
- preparation and characterisation of nanocomposite solid electrolytes
- study of morphology and structural phase transitions in nanophased porous films and nanocomposite solid electrolytes with spectroscopic (X-ray diffraction, Electron diffraction, GISAXS grazing-incidence small-angle X-ray scattering), microscopical (TEM, HREM) and electrical methods (impedance/admittance spectroscopy)
- application of nano-films in the new optical coatings and photosensitive electrodes in dye-sensitized solar cells of new generation. Adequate combinations of films will give multilayered coatings that will induce combined scattering and absorption on nano-particles in chosen matrix. Simultaneously at preparation of nano-films we shall solve problems of adhesion of films to the substrate and adhesion between the layers.
- application of nano-films and nanocomposite solid electrolytes in galvanic cells and dye-sensitized solar cells of the second generation.

Contact person: **Dr. Aleksandra Turković**, Ruđer Bošković Institute, 10002 Zagreb, Bijenička 54, Croatia

· **High-temperature capillarity, contact interaction and fine metal-ceramic interface structure as a scientific base for dissimilar materials joining**

Capillary properties of ceramic-liquid metal interfaces have a pronounced effect in the technologies of a wide range of advanced materials production, fabrication of metal-ceramic joints and also are of great interest in fundamental problems of high temperature physical chemistry. The main objective of the proposed project is to study wettability, reactivity, adhesion energy of metal-ceramic interfaces and develop appropriate methods of control of wetting and bonding which may be used for preparation of metal-ceramic joints by brazing technique, composites manufacturing, crystal growth processes.

Contact person: Prof. Y. Naidich, I.N. Frantsevich Institute for Materials Science Problems of the Ukrainian National Academy of Sciences, 3 Krzhyzhanovsky St., 03142 Kiev, Ukraine.

· **Functionalisation of metal surfaces for the control of proteins interaction**

Surface science approach, combining UHV and in situ measurements were used to immobilise proteins on metal surfaces. Applications are developed for biofilm prevention and elaboration of biosensors

Contact person: Dr C.M. Pradier, Directeur de Recherche, Laboratoire de Physico-Chimie des Surfaces, CNRS, UMR 7045, France

· **Hydroxyapatite as a model biomaterial grown on nanostructured surfaces**

We are seeking partners having an experience in following fields: chemistry of solutions, growth of thin films and coatings, modification and functionalization of solid surfaces, biomaterials, surface engineering, especially partners with well established chemical/physical analysis.

Contact person: **PRAMATAROVA L. D. (Assoc. Prof. Dr.)**, Institute of Solid State Physics, Bulgarian Academy of Sciences

Details

· **Ternary Optical Computer**

Contact person: Yi Jin, Department of Computer Science and Engineering, Northwestern Polytechnical University, Xi'an, China\_

· **Cementation of Au(III) ions on non-stoichiometric cuprous sulphide ( $\text{Cu}_{2-x}\text{S}$ )**

**and their near-surface segregation**

Contact person: Wanda BARZYK, Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences, Niezapominajek Street 8, 30-239 Cracow (Poland)\_

· **Novel technologies for the monitorization of multi-neuron dynamics in living tissue. Integration of microfabricated multi-electrode arrays and photobleaching free optical techniques.**

A system is under development for simultaneous electrical (by means of MEAs) and optical (photobleaching free photon scattering) monitorization of network activity in dissociated neuronal cultures (Fig. 1). In addition to this experimental work, numerical simulation of extracellular electric fields associated with action potentials have been carried out in order to optimise MEA design and maximize the number of detectable neurons (Fig. 2). This system has applications both in basic science as well as in applied biophysics, including drug screening and toxicity tests, with potential for commercialization.

Contact person: Enric Claverol-Tinture, Polytechnic University of Catalonia, Spain\_



## Some recent EU-funded Thematic Networks

[nEUro-IT.net](#), The EU Network of Excellence on Neuro-Information-Technology

The aim of nEUro-IT.net, the *EU Neuro-IT Network of Excellence*, is to build a critical mass of new interdisciplinary research excellence at the interface between NS (Neurosciences) and IT (Information Technologies) within the [European Union](#) and its Associated States.

[TEMPERE](#) - Training and Education for Medical Physics and Engineering Reformation in Europe

[EUPEN](#) - European Physics Education Network

[BIOTECH](#) - Biotechnology Network

[ECCOMAGS](#) - European Calibration and Coordination Of Mobile and Airborne Gamma Spectrometry

[MULTIMETOX](#) - Metal Oxide Multilayers obtained by Cost-Effective New CVD Technologies for Magneto-electronic Microsystems and Nanotechnologies

[COMPETE](#) - The Network for Microelectronics Assembly-Packaging-Interconnection

[secretariat@formatex.org](mailto:secretariat@formatex.org)

