# EULANEST

## European-Latin American Network for Science and Technology

*Joint Call*

SIXTH FRAMEWORK PROGRAMME

Eulanest

# About EULANEST

**The European-Latin American Network for Science and Technology**

EULANEST was realized under the European Union's 6th Framework Programme for Research and Development. The project aimed to promote and coordinate cooperation in science and technology (S&T) between EU Member States and Latin American countries. The ERA-Net action fostered networking and cooperation of European policy-makers and programme managers involved in research cooperation with Latin America in relevant fields of science.

Within the project cooperation activities in S&T between European EULANEST partners and Latin American countries were mapped and benchmarked, identifying best practices and preparing the base for a Joint Action Programme.

The final goal of EULANEST was the launch of a Joint Call cooperatively managed and funded by the European partners and Latin American institutions.

# The Joint Call

**Thematic focus**

EULANEST defined as highlight the launch of a Joint Call to strengthen the development of sustainable joint research cooperation between European and Latin American institutions. The Joint Call aimed to promote research collaboration in the area of Sustainable Renewable Energy in the frame of climate change and Nanosciences with emphasis on human health. Proposals had to be submitted by mixed consortia including European and Latin American participants.

The Joint Call was opened for submission from September to December 2009. After the evaluation and ranking of the proposals by scientific experts from all Joint Call partner countries, the projects to be funded were selected by the European and Latin American EULANEST partners in March 2010. The joint Kick-Off Meeting for the funded projects was held in June 2010 to start the successful realization of the funded activities.

**Results**

All in all 65 proposals were submitted, 39 in the area of Sustainable Renewable Energy and 26 in Nanosciences. The proposals and research teams were of high scientific excellence. Due to limited resources a total of seven projects were selected for funding. Institutions from all EULANEST Joint Call partner countries are represented in the consortia of the selected projects.

| The EULANEST consortium was formed by the following eight institutions from five European countries: |
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| **Spain** (Coordinator)<br>Ministry of Science and Innovation – MICINN |
| **France**<br>Ministry of Foreign and European Affairs – MAEE<br>Ministry of National Education, Higher Education and Research – MENES<br>Research Institute for Development – IRD |
| **Germany**<br>Federal Ministry of Education and Research – BMBF<br>International Bureau of BMBF – IB-BMBF |
| **Norway**<br>Research Council of Norway – RCN |
| **Portugal**<br>Foundation for Science and Technology – FCT |

| The Latin American partners participating in the Joint Call are: |
|---|
| **Brasil**<br>National Council for Scientific and Technological Development – CNPq |
| **Argentina**<br>Ministry of Science, Technology and productive Innovation – MINCYT |

***Project partner:***

- *Federal University of Santa Catarina (Brazil) –* ***Coordination***
- *National University of Rosario (Argentina)*
- *Hamburg University of Technology (Germany)*
- *Institute of Ceramics and Glass ICV-CSIC, Madrid (Spain)*
- *University of Paul Sabatier, Toulouse (France)*
- *Norwegian University of Science and Technology, Trondheim (Norway)*
- *University of Aveiro (Portugal)*

## **SOCs** – Energy conversion from renewable sources in solid oxide cells

**A joint Latin American-European project as contribution to technological research and development towards a feasible hydrogen economy**

In a carbon constraint economy, limited by dwindling fossil fuel reserves and climate change, renewable energy derived from biomass, solar, hydraulic, geothermal and wind power will become increasingly important in the production of hydrogen for fuel cell utilisation. The potential for renewable energy sources is particularly huge in Latin America and European Union countries have been playing a very important role in developing and using technologies for hydrogen production and fuel cell applications.

Combining European and Latin American backgrounds, the overall objective of this joint project is to develop high efficiency technologies of energy conversion based on solid oxide cells operating at high temperatures from renewable sources. Particularly, the following issues are concerned within the subject of the proposed research:

- Application of new materials for components of solid oxide cells (SOCs)
- Production of hydrogen from steam using solid oxide electrolyser cells (SOECs)
- Use of sustainable renewable energy sources as fuels in solid oxide fuel cells (SOFCs)

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***Project partner:***

- *Institute of Technological Development for the Chemical Industry Santa Fe (Argentina) –* ***Coordination***
- *University of Cádiz (Spain)*
- *Spanish National Research Council, Madrid (Spain)*
- *University Pierre et Marie Curie, Paris (France)*

## **CERENH2** – Cerum-based catalysts for the purification of hydrogen from renewable sources: a theoretical and experimental approach of the structure-reactivity relationships

**Enhancing long term relationships of European and Latin American researchers for the development of non-conventional more efficient catalytic material for the purification of molecular hydrogen from renewable sources**

The concerns about global warming have increased the interest in energy sources that can reduce the net carbon dioxide emissions, such as the use of hydrogen (H2) as energy vector in fuel cell operated devices.

The main objective of the project is to contribute to a deep understanding of non-conventional and more efficient catalytic materials in the purification of molecular hydrogen, produced by renewable organic sources, by combining experimental results with theoretical calculations.

The achievement of the project relies on the unique and complementary multidisciplinary expertise of the European and Latin American teams involved. All the groups possess world-known expertise on oxide based catalysts for multiple applications, and some of them have already successfully worked together in similar systems (previous collaborations: Argentina-France, France-Spain, Argentina-Spain).

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***Project partner:***

- *Research Centre Juelich Llc (Germany) –* ***Coordination***
- *SINTEF, Trondheim (Norway)*
- *Federal University of Rio de Janeiro (Brazil)*
- *EnergiaH, Rio de Janeiro (Brazil)*

## **e-SOFC –** Direct Ethanol Solid Oxide Fuel Cell

**Combining European and Latin American knowledge in research towards the use of renewable fuels in Solid Oxide Fuel Cells**

Solid Oxide Fuel Cells (SOFC) are one of the most efficient and promising electricity producing technologies at present. SOFCs are able to directly use a variety of hydrogen rich fuels, such as methane, natural gas, biogas produced from wastes, and other hydrocarbons. Up to now, alcohols have not been considered widely as a fuel for SOFC.

The project addresses the conversion of bio-ethanol to electricity at high efficiencies, building on a complementary association between the four partners of the project. The Brazilian partners have developed an innovative anode material that is able to convert ethanol to electric current directly in the fuel cell with minimal fuel pre-processing. SINTEF has extensive expertise in calculating the reaction kinetics and equilibria in order to prevent the formation of coke in the fuel cell, whereas Juelich has exceptional expertise on engineering materials into real SOFC components. In a joint effort it will be possible to evaluate the Brazilian materials development in SOFC cells and test these for the feasibility of direct utilisation of ethanol for electricity production.

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***Project partner:***

- *Institute of Chemistry, Federal University of Rio Grande do Sul, Porto Alegre (Brazil) –* ***Coordination***
- *Max-Planck-Institute for Polymer Research, Mainz (Germany)*
- *Institute for Biotechnology and Bioengineering, Instituto Superior Técnico, Technical University of Lisbon (Portugal)*

## **GlyMat –** From glycerol towards new materials

**European and Latin American expertise for the preparation of new materials from glycerol-modified vegetable oils or fatty acids**

The design of polymers from renewable sources is currently receiving increasing attention, and interest has focussed on the use of cheap, biodegradable, and annually renewable starting materials to reduce petroleum dependence and the negative impact on the environment. Vegetable oils and glycerol, as by-product of bio-diesel production, are one of the cheapest and most abundant biological sources available in large quantities.

The aim of this project is the preparation of new ecological friendly materials from glycerol-modified vegetable oils (polyols) by bio-catalytic processes in miniemulsion.

The project will improve the collaboration between Brazilian and European partners in the field of polymers and materials from renewable sources. Only the combination of the expertise of each partner can ensure the development of an efficient, environmentally friendly process for the preparation and application of water based polymer dispersions and other materials as emulsifiers from bio-diesel “waste” products.

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***Project partner:***

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- *Technical University of Munich (Germany)*
- *Department of Chemistry, University of Aveiro (Portugal)*
- *Institute for Biochemical Research, National University of La Plata (Argentina)*

## **NEURONANO** – Magnetotransduction: development of magnetic nanoparticle-viral vector complexes for therapeutic gene delivery in the senile brain

**Creating an European-Latin American network to develop a new gene therapy strategy for the treatment of neurodegenerative diseases**

A number of age-related neurological pathologies are of significant medical and economic impact for both Latin American and European regions due to the increase of the elderly population in urban areas. Therefore, the development of novel therapies for neurodegenerative diseases constitutes an issue of growing importance.

Neuronano is a multidisciplinary project aimed to develop new gene therapy-related therapeutic strategies for the treatment of neurodegenerative diseases. Using tools from nanotechnology, nanomagnetism and gene therapy we propose to construct novel, high performance magnetic adenoviral vectors for magnetotransduction, to enhance the levels of neurotrophic factors that prevent the degeneration and enhance recovery of remaining neuron neuroprotective molecules. Starting by animal models of senile neurodegeneration, this therapy could be ultimately used in Alzheimer and Parkinsonian patients.

Among the key outcomes of the project will be the establishment of a collaborative network involving scientific partners from Europe and Latin America, to provide a suitable framework for dissemination activities and training of young researches with multidisciplinary profile.

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***Project partner:***

- *Institute for Bioengineering of Catalonia, Barcelona (Spain) – **Coordination***
- *Institute of Pharmacy, Martin Luther University Halle-Wittenberg (Germany)*
- *Federal University of Rio de Janeiro (Brazil)*
- *National University of La Plata (Argentina)*
- *Technical University of Valencia (Spain)*

## **FIBROGEL** – Bioinspired Nanofibrous Gel for Tissue Engineering of Cartilage and Bone

**Multidisciplinary trans-national research for innovation in the strategy for treatment of injured bone and cartilage**

High incidence of degenerative skeletal tissue disorders such as osteoarthritis and osteoporosis in a progressively aging human population make tissue engineering of cartilage and bone a focus of extensive research. Bone and joint disorders are the most common disease in both European and Latin American countries.

The project's objective is to combine the use of high performance materials and advanced nanotechnology to design an implant with unique properties which can influence the local tissue regeneration. The multidisciplinary project aims to gain radical innovation in the strategy of treating injured bone and cartilage. A strong long-term impact on a variety of fields such as nanobioengineering and regenerative medicine will be achieved.

The cooperation will strengthen the trans-national Latin American-European research cohesion. Additionally the contacts held by the researchers will allow dissemination of knowledge among the biomedical application-oriented research community.

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***Project partner:***

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- *Faculty of Health Sciences, University Fernando Pessoa and Institute of Biotechnology and Bioengineering, Centre of Genetics and Biotechnology, University of Trás-os-Montes and Alto Douro, Porto (Portugal)*
- *National University of Quilmes, Bernal (Argentina)*

# **NanoSkin –** Nanoparticles for the Improved Therapy of Severe Skin Diseases – Leishmaniasis and Squamous Cell Carcinoma as Examples

**Establishing an European-Latin American research platform in the field of nanomedicine**

Nanoparticle drug carriers gain increasing interest in the pharmaceutical market. Recently, however, toxicity of nanoparticles became a matter of concern, too. Today only very few drugs loaded to liposomes have been introduced into the pharmaceutical market worldwide. Facing these limitations, experts in the broad field of nanoparticle research from Argentina, Germany and Portugal have decided to build-up a joint platform for fundamental and transnational research in the field of nanomedicine.

The project aims for an improvement of drug therapy combining classical approaches and targeting host-parasite interactions and host-cancer cell interactions, respectively. Innovative pharmaceutical actives (e.g. antimicrobial peptides) will be compared to current gold-standards – both non-loaded and loaded to nanocarriers which are proven to enhance skin penetration and which are locally well tolerated.

The consortium involving experts from Latin America and Europe covers the spectrum of methods, knowledge and technology needed to build-up and characterise the particles.

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