

CHEMISTRY

FOLDAPPI - FOLDamers Against Protein-Protein Interactions

Foldamers are artificial oligomers that spontaneously fold into secondary structures in a process that resembles protein folding. The scientific goal of the FOLDAPPI project is to investigate the potential of foldamers to disrupt protein-protein interactions, a challenge for traditional drugs based on small molecules. The FOLDAPPI project brings together two big pharmaceutical companies and two universities from four different EU Member States in a multidisciplinary consortium. This investigation could lead to the discovery of therapeutic agents in a variety of diseases involving these kinds of interactions.

Duration: 4 years

Approx. EU Contribution: € 1.1 million

Co-ordinator: Dr. Patrice Talaga, UCB Pharma SA - Belgium, patrice.talaga@ucb-group.com

Partners from: France (Université Bordeaux 1); Germany (Julius-Maximilians-Universität Würzburg); UK (UCB Celltech)

ECONOMICS

QUARISMA – Quality and Risk Management in Meat Chains

QUARISMA's goal is to stimulate more sustainable development in the European meat sector, and simultaneous, to mobilise the scientific knowledge needed to bring this about. The joint intersectoral program will synthesize and place into perspective the seemingly wide divergent topics of Chain Management, Quality and Information Management, as well as Food Safety and Risk Management. The main focus is to maintain the highest food safety and quality for the consumers benefit.

Duration: 4 years

Approx. EU Contribution: € 2.3 million

Co-ordinator: Dr. Martin Hamer, Grenzüberschreitende Integrierte Qualitätssicherung e.V. - Germany, m.hamer@gigs.org

Partners from: Germany (University of Bonn, VION Fresh Meat North GmbH and Deutscher Raiffeisenverband e.V.), Netherlands (University of Wageningen)

ENGINEERING

DECADE- Development of Efficient and Robust Controllers for Advanced Energy Systems

The provision of energy for the development and sustenance of humanity, while improving quality of life and the environment, is one of the great challenges of the next century. To this end the project overall vision is to transfer knowledge related to the development, design, operation and control of advanced energy systems that provide the central elements of a sustainable energy strategy in which energy (heat) and electricity are produced and used in the most economically attractive, robust and efficient way. The energy systems that will be considered for the modelling, validation and implementation of the new controllers and control strategies (both software and hardware designs in chips) include Fuel Cells (Polymer Electrolyte Membrane - PEM or Solid Oxide Fuel Cells - SOFC), Combined Heat and Power systems (CHP), and industrial systems for energy savings.

Duration: 4 years

Approx. EU Contribution: € 760,000

Co-ordinator: Prof. Michael Georgiadis, University of Western Macedonia
mgeorg@otenet.gr

Partners from: Parametric Optimization Solutions Ltd - UK, University of Pannonia – Hungary, Estia Consulting Ltd - Greece.

ENVIRONMENT & GEOSCIENCES

MABFUEL - Marine Algae as Biomass for Biofuels

The project is aimed at investigating the feasibility of using algae (micro and/or macro) as a feedstock for producing enough bio-fuel to replace current world petrol/diesel usage. The project should provide the physical (biomass product) and the intellectual (methodology for production and extraction) tools to enable the bio-fuel sector to base its business on the most suitable and profitable process. The determination of the level of environmental risk-benefit, social and economic risk and economic viability/cost-benefit of the bio-fuel products will be developed. An economic model for viable, industrialised-scale production and identification of the best way for commercialization of the bio-fuel will also be developed. The interdisciplinary consortium includes 7 partners from 3 different countries.

Duration: 4 years

Approx. EU Contribution: € 1.4 million

Co-ordinator: Dr. Julie Maguire, Daithi O'Murchu marine research station ltd (DOMMRS) - Ireland, julie.maguire@dommrc.com

Partners from: Green Biofuels Ltd., Ireland; Centre for Marine Resources and Mariculture, Queens University Belfast, UK; Centre for Renewable Energy, Dundalk

Institute of Technology, Ireland; Food Engineering Dept., Gaziantep University, Turkey; Chemistry Dept., Ege University, Turkey; Dolphin Sea Vegetable Company, UK.

LIFE SCIENCES

OXY-SENSE – A biosensor, image analysis, and work flow system platform for the study of neuronal injury and assessment of cellular bioenergetics

Although ischaemic stroke and neurodegenerative disorders are leading causes of death and disability

worldwide, current treatment regimes are limited in their effectiveness due to a lack of understanding of the development of the neuronal injury within the brain. OXY-SENSE will research the fundamental mechanisms by which neurons and mitochondria respond to variety of factors present during stroke or nerve cell death or other neurological and neurodegenerative disorders. The second aim of OXY-SENSE is create the cellular oxygen sensors for *in vitro* and *in vivo* studies, and the development of supporting computational models. It also aims at acceleration of the technology transfer and the commercial exploitation of research findings.

OXY-SENSE will build on the collective expertise of its participants in the areas of mitochondrial biology, ischaemia/hypoxia, motoneuron degeneration, optical oxygen sensing, cell imaging and intravital microscopy, image analysis, high content analysis, and software design.

Additional benefits from the research would involve the development of more integrated, effective test systems for drug action and drug toxicity analyses, what will have a direct impact on the effectiveness of the development of new drugs.

Duration: 4 years

Approx. EU Contribution: € 580,000

Co-ordinator: Prof. Jochen Prehn, Royal College of Surgeons in Ireland – Ireland, prehn@rcsi.ie

Partners from: Ludwig Maximilians Universitaet Muenchen – Germany, SIEMENS – Austria, LUXEL Biosciences - Ireland.

INDUSTEM – Comparative stem cell research in mouse and humans

InduStem is expected to develop novel methods for producing induced Pluripotent Stem (iPS) cells and for their differentiation to cardiac cells. This will place *InduStem* participants in a competitive position to create tool more efficient and ethical than human embryonic stem (hES) cells. The controlling of cell fate decisions at a molecular level would create a platform for research on drugs.

The scientific and industrial aim of *InduStem* is to generate and maintain iPS cells from mouse and human and to study their differentiation towards the cardiac cells.

The technical focus will be put on generating novel European patents for reprogramming somatic cells to an embryonic state with the design for future cell based therapy in mind.

The main impact of the project is expected as developing the iPS cells for drug testing and regenerative medicine thus bringing potential medical applications closer to reality and much less problematic for ethical and social acceptance.

Duration: 4 years

Approx. EU Contribution: € 900,000

Co-ordinator: Prof. András Dinnyés, Biotalentum Tudásfejlesztő KFT– Hungary, andrasdinnyes@yahoo.com

Partners from: Max Delbrück Center for Molecular Medicine – Germany, Academisch Ziekenhuis Leiden - Leids Universitair Medisch Centrum - The Netherlands.

MATHEMATICS

ARC- Architectural freeform structures from single-curved panels

The topic of the present proposal and especially the methods which are planned to be employed constitute a new direction in applied geometric research and in architectural design.

It is planned to implement the computational framework in a very general fashion so as to have the possibility to include a variety of aspects which play a crucial role in the present application (aesthetics, functional properties of supporting structure, special panel types, limitation to certain panel sizes, distribution of panel sizes, etc.).

Motivated by specific requirements in applications, the research teams will study four types of D-strip models (Principal strip models and derived structures, Panels with approximately straight development, Cylindrical panels, Planar beams in the support structure).

Duration: 4 years

Approx. EU Contribution: € 1.2 million

Co-ordinator: Prof. Helmut Pottmann, Technische Universität Wien – Austria pottmann@geometrie.tuwien.ac.at

Partners from: Evolute GmbH - Austria, RFR Paris -France.

PHYSICS

FIRE - Fluid, Ions and Radiation Ensemble in Integrated Plasma Modelling

Energetic plasmas play an increasingly important role in industrial processes, e.g. for the production of innovative materials. However, such plasmas are also the source of undesirable results as in generating debris in lithographic systems and fast particle damage in EUV light sources.

This project brings together a university, a research institute and a SME each with specific expertise in different aspects of the complex process from plasma formation to particle creation and aggregation. It aims to bridge the remaining gaps through the

update and upgrade of a high-performance computer model to include recent advances in atomic physics. This innovative code will be used to better understand complex aspects of industrial plasmas, leading to the design of wear-resistant EUV light sources and effective, scalable technology of size-controlled nanopowder production.

Duration: 4 years

Approx. Estimated EU contribution: € 1.75 million

Co-ordinator: Dr. John White, University College Dublin, Ireland, john.white@ucd.ie

Partners from: France (EPPRA S.A.S.); Russia (Keldysh Institute of Applied Mathematics)

SOCIAL AND HUMAN SCIENCES

RADIO-PAST – Radiography of the past. Integrated non-destructive approaches to understand and valorise complex archaeological sites

This project aims to join resources and very different skills to tackle every possible aspect connected with the study of complex archaeological sites, from project management to "non-destructive" approaches and methodologies in archaeological research, from visualisation of results to fruition and dissemination of scientific acquisitions.

The very wide and balanced consortium of researchers and specialists will share experience and know-how to achieve a best practice program in a "360°" approach to the archaeology of complex sites that are valuable for research as well as for heritage management. The project will include a long duration program of field-work, elaboration of efficient data collection procedures and new data processing methods, the production of models for interpretation and visualisation of results and the creation of more effective valorisation systems.

Duration: 4 years

Approx. EU Contribution: € 760,000

Co-ordinator: Prof. Cristina Corsi, Universidade de Evora - Portugal,

cricorsi@uevora.pt

Partners from: Belgium (Universiteit Gent), United Kingdom (TimeScape Surveys), Slovenia (Univerza v Ljubljani), Italy (British School at Rome), Netherlands (Past2Present-ArcheoLogic), Austria (Media agency 7reasons – Guenther Weinlinger)