Micro-Nano-Bio Systems (MNBS)

Project Portfolio

Sixth and Seventh Research and Developments Framework Programmes [2002-2013]

DG Information Society and Media
Directorate G "Components & Systems"
Unit G2 Microsystems

APRIL, 2011

LEGAL NOTICE

Foreword

Micro and Nano Bio Systems (MNBS) represents a large cluster of R&D projects (initiated in 2004) targeting systems and applications that have, or interact with, biological components, addressing applications in biomedicine, health, environment, food/beverage and safety. The cluster gathers information on regular basis and encourages diffusion and exchange on science & technology, dissemination and exploitation among the projects. It also identifies synergies and possible collaborations through annual meetings.

MNBS is a rapidly growing market in which Europe (33%) is with USA (42%) and Japan (10%) in leading position. New emerging markets are China and Korea. The market is expected to reach 2.3 B$ in 2012 from roughly 800 M$ in 2008. In 2012, the two largest applications of Bio-microsystems are expected to be point of care *in vitro* diagnostics (IVD) (with 39% market share) and clinical diagnostics, followed by microdispensing, blood monitoring, environmental and industrial testing. The average annual growth for all applications is 17%.

The projects have the same major target of achieving substantial improvement on various aspects of system integration e.g. miniaturization and reduced power consumption, computerisation (employment of ICT) and molecularisation (integration of molecular and cell biology), system quality & reliability and shorter time-to-market.

MNBS regroup activities of projects involving hundreds of private and public organisations from Europe and other parts of the world (e.g. China, Australia, USA, Korea & Mexico). The cluster has been supporting 41 Projects in the last 5 years (24 FP6 and 17 FP7) and 2 Service Actions with a total funding of 171 M€. Currently 19 of those are running.

The group produced so far a huge number of ISI publications, dissemination in international conferences and other mass media, trained hundreds of graduate and PhD students, produced high value patents and capitalised on growing SMEs with added value developments and systems.

Further MNBS activities will play a key role in addressing major socio-economic challenges in the next EC Framework Programme e.g. health, ageing well & inclusion, sustainable bio-based economy and lead markets on eHealth and protective clothing.

Dr. Augusto de Albuqerque
Head of Microsystems Unit
European Commission
Information Society and Media Directorate General

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Micro & Nano Bio Systems (MNBS)

Introduction

MNBS is a major cluster of projects targeting systems and applications that have, or interact with, biological components. The MNBS cluster includes applications in health, environment, and food and beverage industry.

The MNBS area was initiated in July 2005 (during FP6) with a consultation workshop on "Exploiting the new possibilities at the interface of micro& nano systems and the living world". The projects follow different strategies but with the same major target of achieving substantial improvement on system integration (e.g. miniaturization and reduced power consumption, integration of molecular and cell biology), on system quality or & reliability and shorter time-to-market.

The MNBS cluster includes, so far, the following sub-groups, divided by application:

A. Biomedical

A1. Miniaturised and Lab-on-chip systems for biological (in vitro), chemical and biochemical analysis

A2. Systems for in vivo interaction with the human body

A3. Other (e.g., imaging sensors and body area networks)

B. Environment

C. Food and Beverage

This document summarises the cluster activities for FP6 and FP7 and provides a summary fiche for each active project.

List of Projects

The finished FP6 projects are listed below. More information can be retrieved from:

http://cordis.europa.eu/fp7/ict/micro-nanosystems/projects-mnbs_en.html.

Acronym	Instrument	Start Date	Duration (Months)	EC Funding M€	Activity
BIOGNOSIS	STREP	01/08/2005	45	3,88	A1
COCHISE	STREP	01/06/2006	36	1,73	A1
DVT-IMP	STREP	01/09/2006	42	3,28	A1
GOODFOOD	IP	01/01/2004	45	9,00	C
Healthy Aims	IP	01/12/2003	54	14,99	A2
IMANE	STREP	01/01/2006	41	1,94	A2
INDIGO	STREP	28/07/2005	42	1,60	A1
IntelliDrug	STREP	01/01/2004	48	2,00	A2
LOCCANDIA	STREP	01/06/2006	42	2,65	A1
MASCOT	STREP	01/01/2006	47	2,50	A1
Micro2DNA	STREP	01/02/2006	46	2,95	A1
MOT-TEST	STREP	01/10/2005	50	1,45	A2
NANOSPAD	STREP	01/12/2005	42	2,50	A1
NEMOSLAB	STREP	01/01/2006	42	1,90	A1
NeuroProbes	IP	01/01/2006	54	9,99	A2
OPTOLABCARD	STREP	01/09/2005	42	1,64	A1
P.CEZANNE	IP	01/07/2006	56	8,50	A2
S.I.G.H.T.	STREP	01/10/2006	40	2,60	A2
SABIO	STREP	01/01/2006	39	2,20	A1
SEMOFS	STREP	01/09/2005	42	1,89	A1
SENSATION	IP	01/01/2004	52	9,99	A2
SMART-BioMEMS	STREP	01/12/2005	42	2,09	A1
TOXICHIP	STREP	01/02/2006	44	2,75	A1

IP - Large Scale Integrating Collaborative Projects
STREP – Specific Targeted Research Projects
CSA – Coordination and Support Actions

The list of running projects of the MNBS cluster is given below. The last three projects stand out from the alphabetic order because they present some aspects that make them also valuable for other clusters of projects, such as Telecom, internet of things and RF-MEMS.

Acronym	Instrument	Start Date	Duration (Months)	EC Funding M€	Activity
ARAKNES	IP	01/05/2008	48	8,10	A2
ARROWS	STREP	01/07/2010	36	3,29	A1, B and C
Heart-e-Gel	STREP	01/09/2010	36	2,75	A2
LabOnFoil	IP	01/05/2008	48	5,30	A1
microFLUID	STREP	01/06/2008	36	3,20	A1
MiniSurg	STREP	01/06/2008	31	2,35	A3
MIRACLE	IP	01/09/2010	48	6,99	A1
NANOMA	STREP	01/06/2008	36	2,46	A2
NEUWalk	IP	01/06/2010	48	8,80	A2
PASCA	STREP	01/09/2010	36	3,00	A1
Positive	STREP	01/09/2010	36	2,90	A1
PYTHIA	STREP	01/05/2008	36	2,65	A1
SIMS	STREP	01/09/2010	36	2,94	A1
TIME	STREP	01/05/2008	48	3,65	A2
ULTRA	STREP	01/06/2008	36	2,90	A1
VECTOR	IP	01/09/2006	58	7,04	A2
ULTRAsponder	STREP	01/09/2008	36	3,15	A2
WiserBAN	IP	01/09/2010	36	6,89	A3
COWIN	CA	01/10/2010	36	2,72	A, B and C

IP - Large Scale Integrating Collaborative Projects
STREP – Specific Targeted Research Projects
CSA – Coordination and Support Actions

Project Portfolio Statistical Analysis

Type

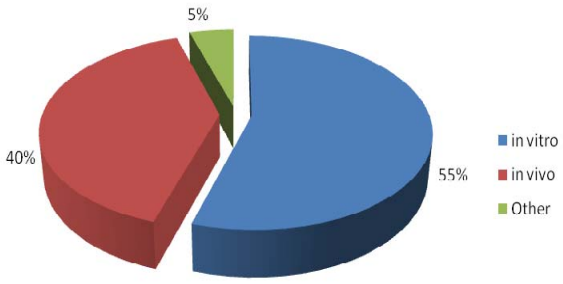

Figure1: FP6 and FP7 *in vivo* vs. *in vitro* projects

Participation

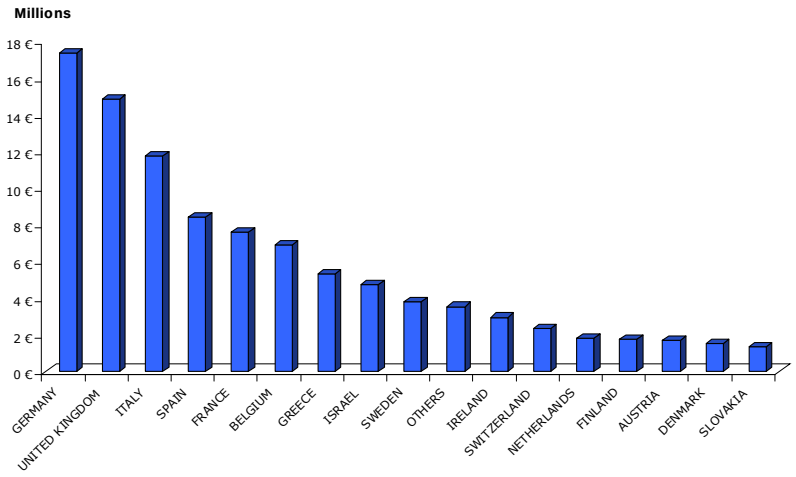

Figure 2: FP6 EC funding by country

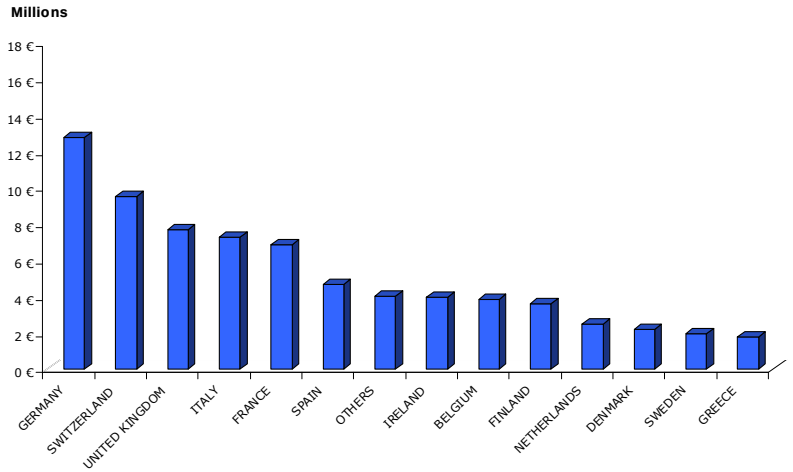

Figure 3: FP7 EC funding by country.

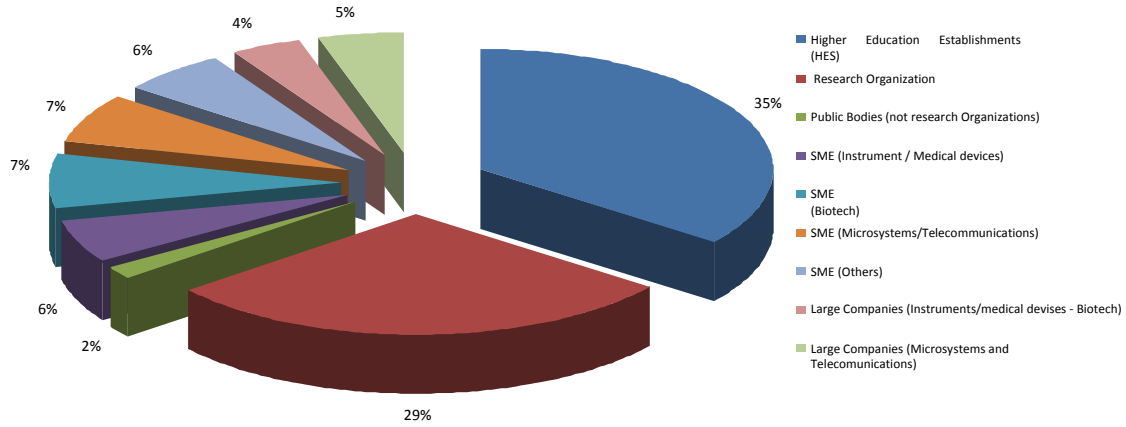

Figure 4: FP6 MNBS beneficiaries by type of activity

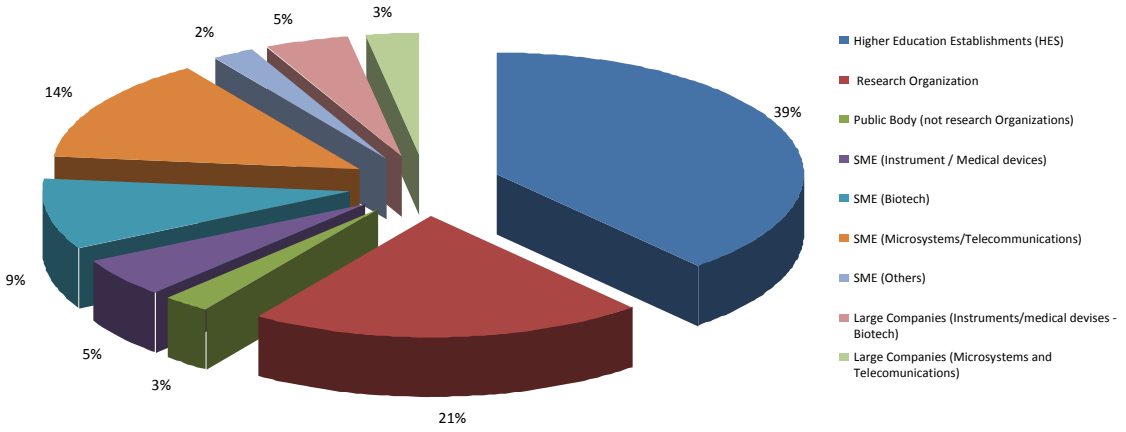

Figure 5: FP7 MNBS beneficiaries by type of activity

SME Categorization:

SME BIOTECHNOLOGY - Companies working in the healthcare industry such as *in vitro* diagnostic companies, research based biochemical companies and manufacturers of different molecular biology reagents.

SME MICROSYSTEMS AND TELECOMMUNICATIONS **-** Companies working on the development and manufacture of micro-electromechanical systems (MEMS), robotic systems and software solutions

SME INSTRUMENTATION AND MEDICAL DEVICES – Companies in the development, manufacturing and distribution of equipment and instruments serving the life sciences market place.

SME OTHERS - Companies providing a wide range of services such as project management consultancy, strategic thinking, market research and business development.

Funding

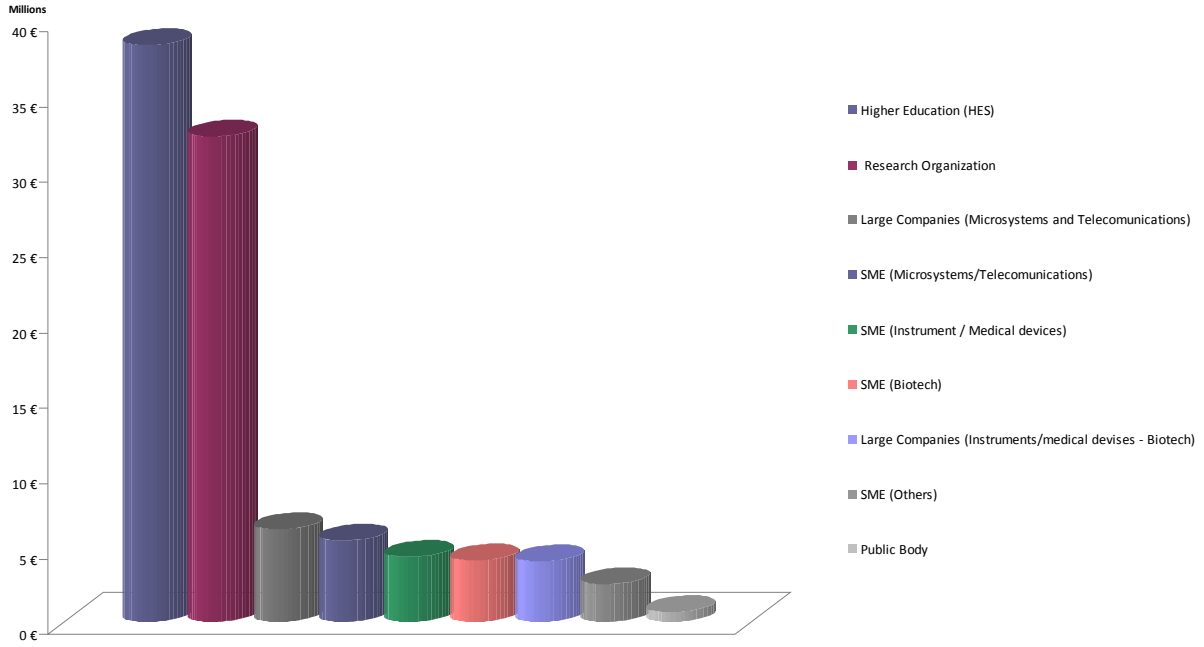

Figure 6: Funding allocation to FP6 MNBS beneficiaries by activity type

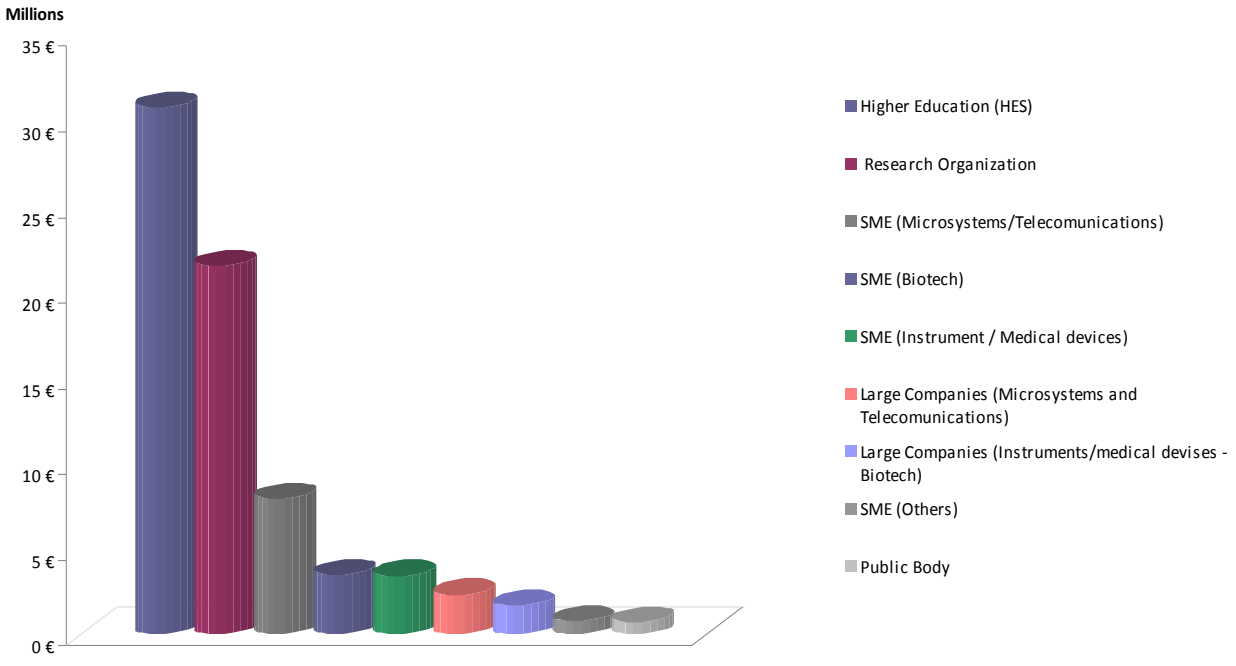

Figure 7: Funding allocation to FP7 MNBS beneficiaries by activity type

Summary of Active Projects

ARAKNES

Array of Robots Augmenting the Kinematics of Endoluminal Surgery

VISION & AIM

ARAKNES stems from the innovative idea of transferring the technologies of bi-manual laparoscopic surgery to the endoluminal surgical approach, thus further reducing the operative trauma and enhancing the therapeutic outcome of minimally invasive surgical procedures for morbid obesity and gastro-esophageal reflux. The worldwide number of bypass surgeries for obesity is predicted to rise up to 1.3 million by 2015, hence the social and industrial impact of **ARAKNES** is considerable. In particular, European health-systems can benefit from major reductions in costs and hospitalisation periods, the effects of which translate directly to improvements in the quality of life for many EU citizens.

Through S&T excellence in micro-robotics and micro-system technologies, **ARAKNES** will facilitate the combination of current state-of-the-art and breakthrough innovations focusing on integrated micro-nano-bio-info devices.

Specifically **ARAKNES** will exploit the convergence of: established laparoscopic techniques; over 20 years of clinical experience with robotic and computer assisted surgery; the maturity of micro-, nano- and bio-technologies and the trend towards wireless, wearable and swallowable devices. This combination enables the conception of a comprehensive micro-robotic based smart operating system for advanced endoluminal surgery, which will reform established endoluminal techniques.

The objectives and impact of **ARAKNES** are broad and ambitious. Consequently, they require a 4-year European project in the format of an IP managed by a strong and committed consortium. The **ARAKNES** consortium is a unique blend of European pioneers in all the involved disciplines (surgery, robotics, information technologies, micro- and nano-technologies) which have the vision, the commitment and the capabilities to make **ARAKNES** successful in terms of scientific innovation, industrial demonstrations and, ultimately, clinical application.

ARAKNES PROJECT NUMBER: **224565**
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WEB SITE: www.araknes.org
TIMELINE: 01/05/2008 - 30/04/2012
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 11,139,811€
EC Funding: 8,100,000 €

PROJECT PARTNERS:
1. Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna - Italy
2. Imperial College of Science, Technology and Medicine - United Kingdom
3. Universita di Pisa - Italy
4. Ecole Polytechnique Federale de Lausanne - Switzerland
5. Microtech S.R.L. - Italy
6. Karl Storz GmbH & Co KG - Germany
7. STMicroelectronics S.R.L. - Italy
8. The University Court of the University of St Andrews - United Kingdom
9. Universitat de Barcelona - Spain
10. Centre National de la Recherche Scientifique - France
11. Novineon Healthcare Technology Partners GmbH - Germany

ARROWS

Advanced interfaced microsystems Research for analysis of Real-World clinical, food, environmental and Waste Samples

VISION & AIM

The goal of **ARROWS** is to develop a microengineered platform for the analysis of 'real-world' samples from the food, drink and healthcare industries. The principle deliverable will be a chip-scale capillary electrophoresis / liquid chromatography mass spectrometer (CE/LC-MS) that matches the performance of today's mainframe systems.

The **ARROWS** innovation is to integrate and interface multiple chip technologies into a platform capable of analysing messy, sticky biological matrices like tissue, food, blood and urine. Our vision is to offer users from the food, environmental and clinical sectors 'more for less' by delivering the functionality of a laboratory-scale, high-end CE/LC-MS system, which today is the size of a filing cabinet, in a mass-deployable tool the size of a desktop PC.
Next-generation micro-analytical devices will be combined into powerful, multi-sensing tools capable of identifying trace quantities of the chemical species of interest (e.g. pesticides, disease biomarkers) in complex biological matrices such as tissue, food and drinking water. It will be developed a MS based on patented ionchip technology.

CE/LC/MS is a universal technique and analytical applications are unlimited. Initially, **ARROWS** will focus on two applications: (a) detection of cancer biomarkers in fractional spots found on tissue, and (b) screening of imported food for contamination. End-users will evaluate the platform.

ARROWS utilizes the 'best-in-class' capabilities to exploit the scaling laws associated with microfluidics, chip-based chromatography and electrophoresis and microengineered advanced mass spectrometry to minimise analysis time, sample volume and reduce manufacturing costs. These scaling laws address the cross-cutting issue of sustainability by reducing solvent consumption, waste and power consumption by orders of magnitude.

ARROWS PROJECT NUMBER: **257669**
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TIMELINE: 01/07/2010 - 30/06/2013
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 4,335,640 €
EC Funding: 3,296,273 €

PROJECT PARTNERS:
1. University College Cork, National University of Ireland, Cork - Ireland
2. Valtion Teknillinen Tutkimuskeskus - Finland
3. Microsaic Systems - United Kingdom
4. CSEM, Centre Suisse d'Electronique et de Microtechnique - Switzerland
5. The Secretary of State for Environment, Food and Rural Affairs - United Kingdom
6. Charité Universitätsmedizin Berlin - Germany

Heart-e-Gel

Microsystem integration based on electroactive polymer gels for cardiovascular applications

VISION & AIM

Actuators based on electroactive polymer (EAP) hydrogels constitute a very attractive yet poorly explored technology. EAP hydrogels can expand and contract by several times their original volume by application of a small voltage. They can be engineered to be either porous or non-porous and the pore density and distribution can also be controlled. Their inherent limitations of very low actuation speed and need to operate in an aqueous medium constitute no impediment – and in fact make them particularly suitable – to a host of medical applications, some of them with high economic and societal relevance.

The **Heart-e-Gel** project utilises a microsystem concept based on electrode activation to change the volume of EAP hydrogels designed for operation in the cardiovascular system. Given the soft and aqueous nature of these gels and considering the need to accommodate for large volume changes, integrating these materials into complete Microsystems poses unique challenges in terms of heterogeneous integration. **Heart-e-Gel** proposes to target specific medical applications and will require modelling of the microsystem-medical interface as well as assessing the potential of different material, actuation, volume sensing, and system delivery options. Three types of systems of immediate interest in cardiovascular surgery have been selected: a generic occluder for vascular repair, a system for improving endografts/stents for the treatment of abdominal aortic aneurysms, and an adaptable band around the pulmonary artery for patients with congenital heart diseases, or with arteriovenous fistulas.

While carrying out the systematic study of EAP hydrogel integration into microsystems, substantial information on processing and characterisation will be gathered and will ultimately lead to a technology library that can enable microsystem designers to address an even wider range of applications.

Heart-e-Gel PROJECT NUMBER: **258909**
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IRELAND
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WEB SITE: http://tyndall.emakina-eu.net/projects/about/1102
TIMELINE: 01/09/2010 - 31/08/2013
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 3,858,790 €
EC Funding: 2,750,000 €

PROJECT PARTNERS:
1. University College Cork, National University of Ireland - Ireland
2. Universiteit Gent - Belgium
3. Interuniversitair Micro-Electronica Centrum VZW - Belgium
4. Tel Aviv University - Israel
5. Katholieke Universiteit Leuven - Belgium
6. Technische Universiteit Delft - The Netherlands
7. Sorin CRM SAS - France
8. Creganna Unlimited Company - Ireland

LABONFOIL

Laboratory Skin Patches and SmartCards based on foils and compatible with a smartphone

VISION & AIM

Conventional analytical methods often require a large sample volume and complicated time-consuming protocols. The objective of this project is to develop ultra low cost laboratories on chips (LOC) without penalisation in time response, sensitivity or simplicity of use. The user will obtain the test results using a very popular interface (a smartphone) and a set of Labcards and Skin Patches where the sample preparation and detection take place.

The project will validate the Labcard in three applications:

- climate prediction by sea CO2 absorption through algae detection,
- Salmonella and Campylobacter typing in slaughter houses and farms,
- Colorectal Cancer monitoring using blood; and the Band Patch in Cocaine consume in professional drivers through sweat.

The new devices will consist of a LOC embedded in a Smartcard or a Skin Patch. The LOC will integrate the Microsystems (valves, pumps, reservoirs, heaters, Organic LEDs and electronics) and Biotechnology (reagents, enzymatic reactions, immobilized layers). This combination will produce a testing system requiring no sample preparation from the user. The Labcard and Skin Patch will be fabricated using a reel-to-reel system decreasing the price to 1% of existing systems (by replacing wafer based substrates with large films based systems). The Labcard will provide new solutions for crisis management (e.g. food poisoning or global warming) and will require small samples to obtain the diagnostic. The Skin Patch will allow controlling the abuse of drugs or analogue substances, and studying time-evolution of several protein markers (e.g. cytokines or hormones). The smart mobile phone will be a Point of Care device and will offer a vast range of communication and interface capabilities.

The project involves 15 partners from 8 countries. They are European leaders in their fields. They represent public (2 research centres and one medical institution) and private sector (6 SMEs and 6 technological centres).

LABONFOIL PROJECT NUMBER: 224306
CONTACT: Dr. Merveille Chris
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WEB SITE: http://www.labonfoil.eu/
TIMELINE: 01/05/2008 - 30/04/2012
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 7,097,810 €
EC Funding: 5,300,000 €
PROJECT PARTNERS:
1. Ikerlan S. Coop - Spain
2. Fundacion Gaiker - Spain
3. University of Southampton - United Kingdom
4. Natural Environment Research Council - United Kingdom
5. Danmarks Tekniske Universitet - Denmark
6. Fundacion Vasca de Innovacion e Investigacion Sanitarias - Spain
7. Politechnika Wroclawska - Poland
8. Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung E.V. - Germany
9. Biosensia Ltd - Ireland
10. Tataa Biocenter AB - Sweden
11. E. V. Group E. Thallner GmbH - Austria
12. Biotools Biotechnological & Medical Laboratories S.A. - Spain
13. Gema Medical S.L. - Spain
14. Micro Resist Technology Gesellschaft für Chemische Materialen Spezieller Photoresistsysteme MBH - Germany

MICROFLUID

Micro-Fabrication of polymeric Lab-on-chip by Ultrafast lasers with Integrated optical Detection

VISION & AIM

Lab-on-chips (LOCs) are microsystems capable of manipulating small (micro to nanoliters) amounts of fluids in microfluidic channels with dimensions of tens to hundreds of micrometers: they have a huge application potential in many diverse fields, ranging from basic science (genomics and proteomics), to chemical synthesis and drug development, point-of-care medical analysis and environmental monitoring. Polymers are rapidly emerging as the material of choice for LOC production, due to the low substrate cost and ease of processing. Notwithstanding their potential, LOC commercial exploitation has been slow so far. Two breakthroughs that could promote LOC diffusion are: (i) a microfabrication technology with low-cost rapid prototyping capabilities; (ii) an integrated on-chip optical detection system. In this project we propose the use of femtosecond lasers as a novel highly flexible microfabrication platform for polymeric LOCs with integrated optical detection, for the realization of low-cost and truly portable biophotonic microsystems. Femtosecond laser processing is a direct, maskless fabrication technique enabling spatially selective three-dimensional material modification. It will be employed in different steps of the LOC production cycle: (i) rapid prototyping of the microfluidic chip using laser ablation or two-photon polymerization; (ii) direct fabrication of optical waveguides and integrated photonic components on the LOC for in situ optical sensing; (iii) master tool fabrication for mass production by replication techniques. The laser fabrication technology will enable to implement a variety of microfluidic LOCs with integrated photonic functionalities. In this project we concentrate on two prototypical applications in the fields of food quality and environmental sensing: LOCs for detection of mycotoxins in animal feeds and LOCs for water screening to detect bacteria and heavy ions contamination.

MICROFLUID PROJECT NUMBER: **224205**
CONTACT: Dr. Roberto Osellame
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E-mail: roberto.osellame@polimi.it
WEB SITE: http://www.ifn.cnr.it/microfluid/
TIMELINE: 01/06/2008 - 31/05/2011
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 4,490,536 €
EC Funding: 3,200,000 €

PROJECT PARTNERS:
1. Consiglio Nazionale delle Ricerche - Italy
2. LZH Laserzentrum Hannover E.V. - Germany
3. Centre National de la Recherche Scientifique - France
4. Politecnico di Milano - Italy
5. The University of Manchester - United Kingdom
6. Agrolabo S.P.A. - Italy
7. CSEM Centre Suisse d'Electronique et de Microtechnique S.A.- Recherche et Developpement -Switzerland
8. Microfluidic Chipshop GmbH - Germany
9. Institut für Mikrotechnik Mainz GmbH - Germany

MINISURG

Miniaturized Stereoscopic Distal Imaging Sensor for Minimally Invasive Surgery

VISION & AIM

Miniaturized Stereoscopic Distal Imaging Sensor for Minimally Invasive Surgery ("MiniSurg") is a project that aims to research and process converging of miniaturized imaging sensor technologies for the most advanced Minimally Invasive Surgery. It aims to overcome packaging, manufacture and potential distortions of CMOS based miniaturized unit. The integrated unit will be of the higher performances a low cost and disposable sensor. MiniSurg's goal is to provide beyond the present state-of-the-art of stereoscopic natural surgery visualization sensor of up to Euro 10 cost. The system on a chip of 7.5mm in diagonal will be designed for maximum area efficiency, by minimizing electrical contacts areas. The beyond the state of the art stereoscopic imaging performances will be achieved by the research and design of pixel array of 2300 horizontal over 1150 vertical and pixel aspect ratio of 2μ width over 3μ height, accompanied by significantly low cross talk level (< 10%). MiniSurg project will address unique packaging design and multilevel interfacing to accomplish the system performance goals. In particular MiniSurg will design chip package for the optic mounting. The high accuracy of this assembly (>>10μm) will enable to shrink the chip for a minimum of pixel area due to the tolerances during optic assembly. MiniSurg incorporates micron sized lens array, an advanced image sensor module and supplementary software algorithm technologies. The Distal Stereoscopic imaging is achieved by collecting light through a pair of left and right pupils, focusing by the micro lens array, each side on a definite pixel column. The micro lenses are fabricated on the sensitive area of the sensor in a FAB, thus adding minimal cost.

MINISURG PROJECT NUMBER: **224251**
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49348
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E-mail: oferb@visionsense.com
WEB SITE: http://minisurg.org/
TIMELINE: 01/06/2008 - 31/03/2011
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 3,084,200 €
EC Funding: 2,350,000 €

PROJECT PARTNERS:
1. Visionsense Ltd - Israel
2. Interuniversitair Micro-Electronica Centrum - Belgium
3. AWAIBA Consultadoria, Desenvolvimento e Comercio de Componentes Microelectronicos, Lda. - Portugal
4. Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung E.V. - Germany
5. Institut de Recherche contre les Cancers de l'Appareil Digestif - France

MIRACLE

Magnetic Isolation and moleculaR Analysis of single CircuLating and disseminated tumor cElls on chip

VISION & AIM

Cancer remains a prominent health concern afflicting modern societies. Continuous innovations and introduction of new technologies are essential to level or even reduce current healthcare spending. As the analysis of occult tumour cells (OTC) in blood or bone marrow is most promising in this respect, **MIRACLE** aims to develop a low-cost, fully automated, integrated lab-on-a-chip (LOC) system for the isolation, counting and characterization of OTCs starting from clinical samples.

A major challenge for OTC detection is their extremely low concentration (below a single cell per mL) in clinical samples. Current detection methods are often based on enrichment techniques followed by cumbersome microscopic analysis of the cell phenotype. Some of these procedure steps have been semi-automated (Cellsearch®, J&J), but the interpretation of the cell morphology requires expertise and remains partially subjective. In contrary to standard phenotyping tests, **MIRACLE** aims to determine the genotype by integrating all sample processing and detection steps in a miniaturized system. This envisaged, fully-automated **MIRACLE** test would yield decisive results within half a day for less than 50 EUR, as compared with contemporary diagnostics tests that may take days.
With the essential individual modules recently demonstrated on automated chips in a joint project by some of the partners involved (MASCOT FP6 027652), the **MIRACLE**'s consortium is uniquely positioned to lead the project's main objectives to a successful outcome, well ahead of the current state-of-the-art. Combining the team's multidisciplinary and unique expertise avoids unnecessary overlap. Integrating all components into a fully operational LOC platform will represent an immense advance for Europe to cope with interfacing and integration problems generic to microfluidic and smart miniaturized systems. More importantly, the realisation of the **MIRACLE** vision will revolutionise cancer diagnostics and individualized theranostics.

MIRACLE PROJECT NUMBER: 257743
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E-mail: lagae@imec.be
WEB SITE: http://www.miracle-fp7.eu/
TIMELINE: 01/09/2010 - 31/08/2014
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 9,185,120 €
EC Funding: 6,999,999 €

PROJECT PARTNERS:
1. Interuniversitair Micro-Electronica Centrum VZW - Belgium
2. Universitat Rovira I Virgili - Spain
3. Institut fuer Mikrotechnik Mainz GMBH - Germany
4. Adnagen AG - Germany
5. MRC Holland B.V. - The Netherlands
6. Oslo Universitetssykehus HF - Norway
7. ThinXXS Microtechnology AG - Germany
8. Consultech Unternehmensberatung GMBH - Germany
9. Kungliga Tekniska Hoegskolan - Sweden
10. Multid Analyses - Sweden
11. Fujirebio Diagnostics AB - Sweden
12. European Cancer Organisation - Belgium
13. Labman automation ltd. - United Kingdom

NANOMA

Nano-Actuators and Nano-Sensors for Medical Applications

VISION & AIM

The NANOMA project aims at proposing novel controlled nanorobotic delivery systems which will be designed to improve the administration of drugs in the treatment and diagnosis of breast cancer. Breast cancer is diagnosed in 1.2 million men and women globally every year and kills 500,000. The NANOMA project proposes a magnetic nanocapsule steering approach that relies on improved gradient coils for Magnetic Resonance Imaging (MRI) systems. MRI systems also provide concentration and tracking information, real-time interventional capabilities and are already widespread in hospitals. It is based on fundamental techniques and methods for the propulsion, navigation and effective targeted delivery of coated ferromagnetic capsules in the cardiovascular system through the induction of force from magnetic gradients generated by a clinical MRI. This proposed NANOMA platform will be a valuable tool to help enhance the efficiency of breast cancer treatments while improving patients recovery time. The project rests on the pillar of six work packages (WPs), which are further divided into subprojects (SPs). Substantial R&D activities are carried out in WP1-WP4 with the goal to design, model and control the microcapsule. In WP5-WP6 new biocarriers and biosensors made of ferromagnetic particles and special functionalized materials reacting to environmental changes in infected cancer cells are being investigated. As proof-of-concept, an in-vivo breast cancer cell detection platform is realized and evaluated in WP7. WP8 deals with the effective Europe-wide exploitation and dissemination of the project results. Finally, WP9 manages the project. The project consortium gives almost a guarantee for the project’s success.

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WEB SITE: http://www.nanoma.eu/home.htm
TIMELINE: 01/06/2008 - 31/05/2011
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 3,893,505 €
EC Funding: 2,459,941 €

PROJECT PARTNERS:
1. Université d'Orleans - France
2. Zenon S.A. Robotics and Informatics - Greece
3. Eidgenoessische Technische Hochschule Zürich - Switzerland
4. Carl von Ossietzky Universität Oldenburg - Germany
5. Biomedical Research Foundation, Academy of Athens - Greece
6. University of Cyprus - Cyprus
7. Femtotools GmbH - Switzerland
8. Pius Hospital - Germany

NEUWalk

Neuroprosthetic interface systems for restoring motor functions

VISION & AIM

The overall concept of the 48-month Integrated Project **NEUWalk** is focused specifically on Objective ICT-2009.3.9 Microsystems and Smart Miniaturised Systems with particular emphasis to c) Application-specific Microsystems and smart miniaturised systems 1) Biomedical objectives. The technological objective of **NEUWalk** is to develop novel microtechnology, microelectronics, brain decoding algorithms and smart control interfaces that can be flexibly assembled to address neurobiomedical issues that not only impact the quality of life in thousands of individuals throughout Europe, but also create a significant economic burden for European countries. These innovative neurotechnologies will be combined to achieve an integrated cortico-spinal neuroprosthetic interface. The underlying objective in **NEUWalk** is to restore motor functions in individuals with severe spinal cord injury (SCI) and to establish a more efficient, less invasive and safer strategy to alleviate Parkinson's disease (PD) syndromes. To achieve this ambitious goal, we will capitalize on recent breakthroughs that demonstrate the impressive capacity of spinal cord stimulations to promote the recovery of full weight bearing walking in paralyzed SCI rats and to alleviate severe Parkinsonian symptoms in rodents. Elaboration and validation of the **NEUWalk** concept will be carried out in rats with SCI and non-human primates with PD. To accelerate the translation towards efficient clinical therapies, preliminary testing will be conducted in humans with SCI. The potential impact of the microtechnology, microelectronics, and treatment paradigms developed in **NEUWalk** is tremendous. These advances will open avenues for revolutionary clinical applications and will contribute to fill the increasingly wider gap that separates European research on Neuroprosthetics to similar studies conducted in the United States. Beyond SCI and PD, the **NEUWalk** concepts will fertilize new designs for the treatment of other neurologic disorders.

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WEB SITE: http://www.neuwalk.eu/
TIMELINE: 01/06/2010 - 31/05/2014
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 11,270,091 €
EC Funding: 8,800,000€

PROJECT PARTNERS:
1. Institut fuer mikrotechnik mainz GmbH- Germany
2. Universitaet Zuerich - Switzerland
3. Eidgenössische Technische Hochschule Zürich - Switzerland
4. Scuola Superiore Di Studi Universitari e Di Perfezionamento Sant'Anna - Italy
5. University College London - United kingdom
6. Universite Victor Segalen Bordeaux II - France
7. Inomed Medizintechnik GMBH - Germany
8. Mega elektroniikka OY - Finland
9. Finetech medical limited - United Kingdom

P.CEZANNE

Development of an Implantable bio-sensor for Continuous Care and Monitoring of Diabetic Patients

VISION & AIM

Around 8.6% of the western population suffers from type 1 or 2 diabetes and rates are expected to rise due to rapid changes in diet habits. To stabilize their daily condition and allow normal life, diabetic patients must constantly monitor their blood glucose level (BGL) and inject themselves with insulin several times a day. Failure to regulate their blood glucose concentrations and fluctuations in glucose blood level over a long period may be critical and lead to severe secondary complications, such as myocardial infarction, stroke, peripheral vascular disease, kidney diseases, diseases of the nervous system, and retinopathy leading to blindness. All attempts to develop extra-body devices have failed so far for many reasons. The main goal of this project is to provide the medical caregivers with an IST tool that is capable to monitor in real-time the glucose levels of this community. Hence, micro sensors implanted under the skin measuring BGL on a continuous basis seem to be the most suitable solution. The main objective is to research and develop a novel implantable long-term nano-sensor for continuous BGL monitoring. The nano-sensor will be linked to the wireless device platform of the ICT system and the data will be automatically collected, stored and processed. The novelty of CÉZANNE lies within the nano-sensor containing living cells or proteins, compact capsule with optics and microelectronics that measures continuously to provide physicians with online medical data The processed data will also be used for automatic regulating of the glucose level by linking it to an insulin pump that accurately releases insulin into the body in response to the fluctuations of glucose concentrations. Furthermore, the system design may be applicable to other diseases related to monitoring other medical parameters by changing the biological substrate in the sensor. Such technology will provide better means for monitoring and treating people with diabetes.

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TIMELINE: 01/07/2006 - 28/02/2011
BUDGET AND FUNDING SCHEME: IP
Overall Cost: 14,143,106 €
EC Funding: 8,500,000 €

PROJECT PARTNERS:
1. Clalit health services - Israel
2. Ustav Polymerov - Slovenska Akademia Vied- Slovakia
3. Foundation for Research and Technology Hellas - Greece
4. Agencia Estatal Consejo Superior de Investigaciones Científicas - Spain
5. Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E.V.- Germany
6. FIMI S.R.L. - Italy
7. Labman Automation Ltd. - United Kingdom
8. Robert Bosch GmbH - Germany
9. Protech AF Ltd. - United Kingdom
10. Siveco romania, SA - Romania
11. Microtech S.R.L. - Italy
12. OSM-DAN Ltd. - Israel
13. Bar-Ilan University - Israel
14. Afcon Industries Ltd.- Israel
15. Tadiran Batteries Ltd.- Israel

PASCA

Platform for Advanced Single Cell-Manipulation and Analysis

VISION & AIM

Analysis of biological cells down to single cell resolution is a prospective technique in nearly all fields of life science research. In particular manipulation and analysis of single cells can open up a new dimension in cell biology, tissue engineering, drug development and diagnostics. The advancement of single cell technology as a whole requires tools and instrumentation to sort, transport and manipulate single living cells. Micro system technology with its sophistications can provide in this context capabilities far beyond today's methods. Therefore, this project aims to develop a single cell manipulator (SCM) micro instrument for inkjet like printing of single living cells confined in micro droplets of only 50µm size. Such a device can serve as a universal tool for manipulating cells in a non-invasive flexible manner. Within the project the SCM device will be applied to cell biological applications in cancer research and drug development to demonstrate and validate the performance of the device, as well as to establish a flexible platform for advanced single cell-manipulation and analysis (**PASCA**).

In order to achieve these objectives crosscutting technological challenges have to be faced which can be overcome by integrating and interfacing multiple core technologies, only. Cutting edge bio-sensing technology like impedance spectroscopy and state of the art micro dispensing methods will be applied and combined with latest cell biological methods to establish the SCM instrument as multifunctional microsystem for cell manipulation. Through the highly innovative integrated approach and the validation within the **PASCA** platform the SCM instrument has excellent exploitation perspectives in multiple application sectors. Also the project structure as a a whole supports the objectives of the work program: By intensively involving SMEs to feed the innovation cycle and by bringing the user into research cycles through the open access partner structure.

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TIMELINE: 01/09/2010 - 31/08/2013
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 3,935,225 €
EC Funding: 3,000,000 €

PROJECT PARTNERS:
1. Albert - Ludwigs - Universitaet Freiburg - Germany
2. Sophion Bioscience A/S - Denmark
3. Innovative Technologies in Biological Systems - Spain
4. Biofluidix GmbH - Germany.
5. University of Dublin, Trinity College - Ireland
6. Zurich Instruments AG - Switzerland
7. Primadiag SAS - France

Positive

A highly integrated and sensitive POROus SIlicon based lab on a chip for multiple quantitaTIVE monitoring of Food allergies at point of care.

VISION & AIM

By integrating and interfacing multiple core technologies and related materials from fluidics and photonics technology to porous silicon (porSi) and polymers, **Positive** will target the implementation of a Microsystems tailored to a specific application with a key societal and economic need. The very high surface to volume ratio of porSi permits very high surface densities of bound antibody-antigen complexes in a reduced volume that through a novel optical interaction leads to scores of sensing areas on a 1cm2 chip with detection-limits down to ~0.1 pg/mm2, significantly beyond state of the art for highly integrated label free sensors at point of care. This offers the further advantageous possibility of assaying several parameters simultaneously (multi-assay) leading to further increases in the reliability and reductions in the measurement uncertainty of a diagnostic over single-parameter assays. The novel Lab-on-Chip technology has the potential to be fast and easy to use, making routine screening or monitoring with immunoassays more cost-effective.

The ultimate goal of **Positive** will be to demonstrate a safe and rapid low cost diagnostic test for food allergies at point of care such as in a GP's office or hospital. A quantitative determination of allergy sensitization is expected within ~15' of adding 100µl of blood. A final prototype consisting of a packaged biochip and reader will be used on clinical samples in order to determine sensitization to allergens such as that for hen's eggs, cow's milk, peanuts, wheat, treenuts, fish, sesame, and shrimp ingestion.

The two industrial partners with their international market strategies and a clinical specialist for food allergies in children as an end-user will enable us to target the whole value chain from research to validation. It is therefore expected that this novel and beyond state of the art Lab-on -Chip will give impetus to the global competitiveness and profitability of European industry in Microsystems activities.

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TIMELINE: 01/09/2010 - 31/08/2013
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 3,744,778 €
EC Funding: 2,900,000 €

PROJECT PARTNERS:
1. Kungliga Tekniska Hoegskolan - Sweden
2. CSEM Centre Suisse D'Electronique et De Microtechnique SA - Recherche et Developpement - Switzerland
3. Farfield group Ltd - United Kingdom
4. Phylogene - France
5. Charite - Universitaetsmedizin Berlin - Germany
6. Universita Degli Studi di Trento - Italy
7. Consiglio Nazionale Delle Ricerche - Italy
8. Universitat de Valencia - Spain

PYTHIA

Monolithically Integrated Interferometric Biochips for label-free Early Detection of Human Diseases

VISION & AIM

The proposed project aims at the development of a novel biochip based on monolithic, fully integrated biosensor array fabricated by standard Si-technology and its application to the early diagnosis of human diseases through label-free and multi-analyte detection. The basic sensor scheme consists of a VIS-NIR light source and a waveguide monolithically fabricated on a silicon wafer, while its principle of operation is the spectroscopic interference due to the optical path difference originating by biochemical events. The signal recording will be realized either via an also monolithically fabricated photodetector or via an external spectrophotometer. This dual approach will provide the user with higher flexibility in terms of the recording, since it will exploit both the intensity and spectral characteristics of the output signal. The integrated nature of the basic biosensor scheme allows for the development of arrays tailored to specific diagnostic applications. Each biosensor array will be comprised of individually functionalized light source/optical fiber series coupled to a single detector for multiplexing operation. Encapsulation with an appropriately designed microfluidic system will allow for the easy delivery of the samples to be analyzed and ensure the facile contact with the external low-noise electronic components. The encapsulated array will be fixed on a cartridge with all the necessary electronics, ready to be manually inserted to its final position in the housing, where it will be directly connected to the optical and electrical interconnects. The biochip, controlled by accompanying user-friendly software, will be capable of simultaneous multi-analyte detection (e.g. mutations of specific genes), and real-time monitoring and processing, with a detection duration that will not exceed a few minutes with minimal blood sample volumes or specimens.

PYTHIA PROJECT NUMBER: **224030**
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WEB SITE: http://www.pythia-project.eu/index.php
TIMELINE: 01/05/2008 - 30/04/2011
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 3,478,180 €
EC Funding: 2,650,000 €

PROJECT PARTNERS:
1. National Centre for Scientific Research "Demokritos" - Greece
2. Valtion Teknillinen Tutkimuskeskus - Finland
3. Phoenix B.V. - The Netherlands
4. Jobst Technologies GmbH - Germany
5. Lionix B.V. - The Netherlands
6. Uniwersytet Jagiellonski - Poland
7. Kentro Gennetikon Erevnon Kai Analyseon A.E. - Greece
8. University College London - United Kingdom

SIMS

Development of a Smart Integrated Miniaturised Sensor System for analytical challenges in diagnostics, industry and the environment

VISION & AIM

The widespread availability of smart miniaturised systems is limited by the inability to integrate a sufficient number of functionalities into a single device at low cost and high volume using traditional production technologies. Organic, flexible and printed electronics (OFPE) offers this possibility. However, it too must overcome some significant challenges relating to device interfacing and fabrication. Key among these is the availability of subsystems (sensors, displays, power and circuitry) suitable for integration through OFPE, as well as the ability to combine these components through compatible processes.

SIMS will develop a smart, miniaturised sensing system through the integration of a nanosensor, printed low cost display, mobile phone interface and printed battery with organic circuitry. Integration will take place on a single substrate employing photolithography, screen and ink jet printing and lamination.

SIMS will be a platform technology. Its broad potential, including industrial and environmental monitoring, will be illustrated through the sensitive detection of hydrogen peroxide. However, due to the scale of the diagnostics market and its relevance to the partners, **SIMS** will focus on the quantitative measurement of cholesterol.

SIMS will be low cost, disposable, and free from instrument calibration and maintenance. It will vastly expand the opportunities for distributed testing, creating new markets through innovative retailing opportunities. Increased testing will result in benefits to the health and the environment of people in Europe and beyond.

The **SIMS** consortium includes three leading academic groups covering device physics, electroanalytical chemistry, materials science, electronic and production engineering, as well as two innovative SMEs in the full value chain from speciality materials suppliers, through mass producers, and to a global company in diagnostics with worldwide distribution networks.

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TIMELINE: 01/09/2010 - 31/08/2013
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 3,920,416 €
EC Funding: 2,949,525 €

PROJECT PARTNERS:
1. Dublin City University - Ireland
2. Unipath Ltd - United Kingdom
3. NTERA Ltd - Ireland
4. Prelonic technologies GmbH - Austria
5. University of Liverpool - United Kingdom
6. Valtion Teknillinen Tutkimuskeskus - Finland

TIME

Transverse, Intrafascicular Multichannel Electrode system for induction of sensation and treatment of phantom limb pain in amputees

VISION & AIM

Amputation of a limb is a surgical intervention used as a last resort to remove irreparably damaged, diseased, or congenitally malformed limbs where retention of the limb is a threat to the well-being of the individual. The procedure traumatically alters the body image, but often leaves sensations that refer to the missing body part, the phantom limb. In 50-80% of cases, these sensations are painful and currently, there are no effective treatment modalities. Given sufficient control over a large number of nerve fibers, a neural interface may be able to artificially evoke sensations of touch, or counteract the phantom limb pain. The application of Micro/nano technologies with functional electrical micro stimulation can not only pave the road towards a treatment, but also provide amputees a means to sense virtual environments directly. The ultimate aim of this project is to develop this novel Human Machine Interface (HMI). A novel microfabricated neural interface, the Thin-film Intrafascicular Multichannel Electrode array, and implantable multichannel stimulator system will form the key core technological developments in the project. The work is structured in 10 work packages in three phases. The technological development phase will model, design, manufacture and characterize the multi-channel electrode (**TIME**) and design, manufacture and test an implantable, multi-channel stimulator. In vivo characterization phase will evaluate the **TIME** electrodes for biocompatibility, stability and chronic safety in animals and develop a psychophysical test platform for system integration. Finally, pre-clinical evaluation will test the system in short-term implants in amputee subjects. The work will provide direct contribution to the next-generation smart systems in the ICT-2007.3.6 Nano/Micro priority, strengthen Europe’s leading position in advanced electronic systems/biomedical applications, and improve the quality of life for amputees with phantom limb pain.

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WEB SITE: http://www.project-time.eu/
TIMELINE: 01/05/2008 - 30/04/2012
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 4,763,774 €
EC Funding: 3,650,000 €

PROJECT PARTNERS:
1. Aalborg Universitet - Denmark
2. Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna - Italy
3. Universitat Autonoma de Barcelona - Spain
4. Albert-Ludwigs-Universität Freiburg - Germany
5. Université Montpellier II - France
6. Neuromedics S.A.S. - France
7. Universita "Campus Bio-Medico" di Roma - Italy
8. Indiana University - United States

ULTRA

Ultrafast eLectronics for Terahertz Rapid Analysis in compact lab-on-chips applications

VISION & AIM

In Medicine and Biology a fast, low cost and accurate analysis of samples, such as cancerous tissues or bio-molecules is of crucial importance. Nowadays, several medical instruments making use of different regions of the electromagnetic spectrum are available to carry out analysis of samples, but their size, complexity and cost remain very high. Moreover, not all the regions of the electromagnetic spectrum are currently used and new, unexplored regions show exciting potential to greatly enhance analytic capabilities beyond what is possible today. The aim of the ULTRA project is to devise two new instruments with application in medical, biological and chemical analysis and detection. Both new instruments will be low cost, reliable, with low power consumption and with an extremely compact form factor by virtue of their lab-on-chip nature. They will be suitable for applications not currently covered by other instruments. They will be based on the use of terahertz radiation which is the last untapped region of the electromagnetic spectrum and which has demonstrated a high potential for cancerous tissue detection and for label-free biomolecular sensing. One of the two instruments will, in addition, exploit plasmonics to achieve unprecedented sensitivity for biochemical detection in the THz frequency range. The development of such completely new instruments requires competences in several areas and the combined efforts of different groups, all leaders in their fields, is necessary to successfully tackle the problem. The innovative content of the proposal resides in the combination of the three emerging fields of “plasmonics”, “THz technology” and “microsystem integration” and in the creation of completely new, integrated THz and plasmonics components. This consortium, due to its leading position in the field of THz, integration technology and THz plasmonics is the ideal working group to successfully face this challenge.

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TIMELINE: 01/06/2008 - 31/05/2011

BUDGET AND FUNDING SCHEME: CP
Overall Cost: 4,410,605 €
EC Funding: 2,900,000 €
PROJECT PARTNERS:
1. Philips Electronics Nederland B.V. - The Netherlands
2. Stichting voor Fundamenteel Onderzoek der Materie - The Netherlands
3. Universität Siegen - Germany
4. Uppsala Universitet - Sweden
5. Microtec Gesellschaft für Mikrotechnologies MBH - Germany
6. Commissariat a l'Energie Atomique - France

VECTOR

Versatile Endoscopic Capsule for Gastrointestinal Tumor Recognition and Therapy

VISION & AIM

The project pursues to goal of realizing smart pill technologies and applications for gastrointestinal diagnosis and therapy. Cancers of the digestive tract are among the most significant killers in developed countries, with colon cancer ranging among the top 10 causes of death for both genders, male and female. If the disease is detected at this stage of pre-malignancy, local therapy, such as tissue resection or destruction, can be used to eradicate the disease before malignant transformation and the onset of invasive cancer. The overall medical goal of the project is to enable medical devices through advanced technology that can dramatically improve early detection and treatment of gastrointestinal early cancers and cancer precursors. The main technological objective of the project is the take-up of microsystems and sub-components and their integration into robotic, mobile pill devices for useful and large impact applications in the medical field. The primary market goal of the project is to provide groundbreaking technology leads and platform technologies to European biomedical companies for future conversion into competitive novel products. This shall support the European biomedical industry in the international medical device market and help build up a franchise in the booming sector of cancer prevention, early diagnosis and treatment technologies. The structure of the project is focused on the creation of technology platforms based on the medical requirements.

VECTOR PROJECT NUMBER: 33970 (FP6)
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WEB SITE: http://www.vector-project.com/
TIMELINE: 01/09/2008 - 28/02/2011
BUDGET AND FUNDING SCHEME: IP
Overall Cost: 9,509,257 €
EC Funding: 7,044,309 €

PROJECT PARTNERS:
1. Novineon Healthcare Technology - Germany
2. Scuola Superiore Sant'Anna - Italy
3. STIFTELSEN SINTEF - Norway
4. Korean Institute of Science and Technology Europe - Germany
5. Sensitec GmbH - Germany
6. Katholieke Universiteit Leuven Research & Development - Belgium
7. Ecole Polytechnique Federale de Lausanne - Switzerland
8. Centre de Transfert en Micro et Nanotechnologies - France
9. Endosmart Gesellschaft für innovative Medizintechnikg mbH - Germany
10. Society for Medical Innovation & Technology - SMIT E.V. - Germany
11. Ovesco Endoscopy GmbH - Germany
12. Virtual Institute on Micromechatronics for Biomedical Industry AISBL - Belgium
13. Era Endoscopy S.R.L. - Spain
14. Universitat de Barcelona - Spain
15. Foundation for Research and Technology - Hellas - Greece
16. Verein zur Förderung von Innovationen durch Forschung, Entwicklung und Technologietransfer e.V. (INNOVENT e.V.) - Germany
17. Korea Institute of Science and Technology Information - Korea
18. Jagiellonian University - Poland
19. NEURICAM, S.P.A. - Italy

ULTRASPONDER

In vivo Ultrasonic Transponder System for Biomedical Applications

VISION & AIM

The key objective of ULTRAsponder is to develop a novel telemetry technology for biomedical applications that will enable any kind of deeply implanted device (the transponder) to communicate and be powered wirelessly via acoustic waves with the external system (the control unit). The implanted transponder will include one or more sensors for monitoring a variety of parameters, such as temperature, pressure, or fluid flow. Local digital signal processing will allow the transponder to act smartly and transmit only significant data, reducing its power needs. As part of a network, several transponders will communicate and exchange information with the external control unit. The control unit will be placed on the patient's skin, and it will control, energize and communicate through acoustic waves (ultrasonic) with the implanted transponders. Moreover, it will be used as a data logger, which relays the recorded data from the transponders network, towards the patient's environment via cellular, plain telephone service (POTS) or IP based networks. The key innovations of ULTRAsponder will be the following: (i) development of a novel telemetry technique based on the backscattering principle to ensure efficient data communication through acoustic waves from the implanted transponder to the external control unit, (ii) wireless communication through acoustic waves from the control unit to the transponder, (iii) remote powering of the transponder through acoustic waves using a beam-forming technique to increase efficiency and hence to reduce charge time (iv) internal pre-treatment of the sensor measurements thanks to local massive and low power signal processing capabilities, (v) high flexibility and modularity of the transponder to be easily adaptable to any kind of sensor, (vi) test of the overall system in real environment for a particular application to measure physiological parameters, (vii) contribution to the standardization of body sensor networks using acoustic waves

ULTRASPONDER PROJECT NUMBER: **224009**
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WEB SITE: http://www.ultrasponder.org/
TIMELINE: 01/05/2008 - 01/09/2008
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 4,325,718 €
EC Funding: 3,149,997 €

PROJECT PARTNERS:
1. Ecole Polytechnique Federale de Lausanne - Switzerland
2. Medtronic Bakken Research Center B.V. - The Netherlands
3. Imasonic SAS - France
4. CSEM Centre Suisse d'Lectronique et de Microtechnique SA - Recherche et Developpement - Switzerland
5. Institut National de la Sante et de la Recherche Medicale (INSERM) - France
6. Haute Ecole Specialisee Suisse Occidentale - Switzerland
7. Rikshospitalet HF - Norway
8. IMST GmbH - Germany
9. Sciprom SARL - Switzerland

WiserBan

Smart miniature low-power wireless microsystem for Body Area Networks

VISION & AIM

The **WiserBAN** project will create an ultra-miniature and ultra low-power RF-Microsystems for wireless Body Area Networks (BAN) targeting primarily wearable and implanted devices for healthcare, biomedical and lifestyle applications. The proposed research concerns the extreme miniaturization of the BAN with primarily the areas of ultra low-power radio SoC (System on Chip), RF and Low-frequency MEMS, miniature reconfigurable antennas, miniaturized SiP (System in Package), sensor signal processing and flexible communication protocols.

The **WiserBAN** Microsystems will be 50 times smaller than today's radio modules for Personal Area Networks (PAN) solutions, e.g. Bluetooth that can simply not be embedded in a variety of tiny implants and wearable applications. **WiserBAN** will thus enable significant take up by the European SME's and industries in healthcare, bio-medical and lifestyle.

WiserBAN will also create a major impact on the quality of life of the European Citizens, in particular for improving the comfort and access to ICT for impaired and disabled people of all ages carrying implants or wearing medical devices, hence reducing the risk of social exclusion.

WiserBan PROJECT NUMBER: 257454
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TIMELINE: 01/09/2010 - 31/08/2013
BUDGET AND FUNDING SCHEME: CP
Overall Cost: 9,580,879 €
EC Funding: 6,899,035 €

PROJECT PARTNERS:
1. CSEM Centre Suisse d'electronique et de Microtechnique SA - Recherche et Developpement -Switzerland
2. Commissariat a l'Energie Atomique et aux Energies Alternatives - France
3. Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E.V. - Germany
4. Valtion Teknillinen Tutkimuskeskus - Finland
5. Technische Universitat Berlin - Germany
6. Alma Mater Studiorum - Universita di Bologna - Italy
7. SORIN CRM SAS - France
8. EPCOS SAS - France
9. MED-EL Elektromedizinische Geraete GmbH - Austria
10. Siemens Audiologische Technik GmbH - Germany
11. Debiotech S.A. - Switzerland
12. Signalgenerix ltd - Cyprus
13. RTD talos ltd - Cyprus

COWIN

Converging resources to support the value creation in Europe of Microsystems and Smart Miniaturized Systems research projects

VISION & AIM

COWIN will optimize commercial exploitation of EU RTD projects, based on the setting up of a dedicated network reinforcing collaborations and joint value of existing resources supporting Microsystems and smart miniaturized systems competitiveness in Europe.

COWIN's objectives are:

- To facilitate better commercial exploitations of EU RTD projects. Our objectives are that over the 91 FP6 and FP7 research projects funded by the EU, about 35 ones reach further development milestones following a value creation roadmap, about 15 projects start collaborations with strategic industrial partners for IP licensing and technology transfer and that about 10 new companies are identified and proposed to the investors.

- To set up a dedicated network for value creation. We will converge available resources in facilitating interactions and collaborations of academic, industrial, public and private investors. A specific action will be conducted in the diagnostic and food/beverage quality fields.

- To close the research, industry, and private investment gaps. We will provide with recommendations of actions identified by consultation of all the different parties.

COWIN actions will be undertaken by partners with complementary technical, market and RTD financing expertise with the support of a strategic committee of experts composed of technology platforms, industrials, VC's and RTD financing programs representatives.

COWIN PROJECT NUMBER: **258898**
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TIMELINE: 01/10/2010 – 30/09/2013
BUDGET AND FUNDING SCHEME: CSA
Overall Cost: 2,911,197 €
EC Funding: 2,729,982 €

PROJECT PARTNERS:
1. Yole Developpement SARL - France
2. VDI/VDE Innovation + technik GmbH - Germany
3. Zabala Innovation Consulting, S.A. - Spain
4. Association Euripides - France
5. Tartu Biotehnoloogia Park AS - Estonia