DEDALE

Project reference: 665044
Funded under: H2020-EU.1.2.1.

Data Learning on Manifolds and Future Challenges

From 2015-10-01 **to** 2018-10-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 702 397,5	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 702 397,5	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
France	RIA - Research and Innovation action

Objective

"Future data processing challenges in science will enter the ""Big Data"" era, involving massive, as well as complex and heterogeneous data. Extracting, with high precision, every bit of information from scientific data requires overcoming fundamental statistical challenges, which mandate the design of dedicated methods that must be both effective enough to capture the intricacy of real-world datasets and robust to the high complexity of instrumental measurements. Moreover, future datasets, such as those provided by the space mission Euclid, will involve at least gigascale data, which will make mandatory the development of new, physically relevant, data models and the implementation of effective and computationally efficient processing tools. The recent emergence of novel data analysis methods in machine learning should foster a new modeling framework, allowing for a better preservation of the intrinsic physical properties of real data that generally live on intricate spaces, such as signal manifolds. Furthermore, advances in operations research and optimization theory pave the way for effective solutions to overcome the large-scale data processing bottlenecks. In this context, the objective of the DEDALE project is threefold: i) introduce new models and methods to analyze and restore complex, multivariate, manifold-based signals; ii) exploit the current knowledge in optimization and operations research to build efficient numerical data processing algorithms in the large-scale settings; and iii) show the reliability of the proposed data modeling and analysis technologies to tackle Scientific Big Data challenges in two different applications: one in cosmology, to map the dark matter mass map of the universe, and one in remote sensing to increase the capabilities of automatic airborne imaging analysis systems."

Coordinator

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
France

France
EU contribution: EUR 685 000

Participants

FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS
Greece

Greece
EU contribution: EUR 560 000

SAGEM DEFENSE SECURITE SA
France

France
EU contribution: EUR 461 000

UNIVERSITY COLLEGE LONDON
United Kingdom

United Kingdom
EU contribution: EUR 485 397,5

TECHNISCHE UNIVERSITAET BERLIN
Germany

Germany
EU contribution: EUR 511 000

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Permalink: http://cordis.europa.eu/html

InnoSMART

Project reference: 664892
Funded under: H2020-EU.1.2.1.

An Innovative Method for Improving the Structural Integrity using SMA Revolutionary Technology

From 2015-07-01 **to** 2018-07-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 1 995 113	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 1 995 113	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
United Kingdom	RIA - Research and Innovation action

Objective

The project proposes to develop a revolutionary coating that will be able to alter and control the mechanical properties of materials by external stimuli. This novel coating will be able to contribute to the stiffness and rigidity of an elastic metallic structure, to withstand the expected loading conditions safely, to enhance the integrity of a damaged structure and at the same time to protect it from corrosion. Such coating can bring multiple breakthroughs from the design level to the maintenance and repair level of the structure. The innovative compounds of the proposed coating are elements of smart materials - Shape Memory Alloys (SMAs). SMA elements are designed materials that have one or more properties that can be significantly changed in a controlled fashion by external stimuli. They can sense temperatures or stress as a function of change in damping, stiffness, electrical resistivity and deflection. It is specifically the latter aspect, which makes SMAs highly interesting for the particular application, since it is the actuation function built into the material. The innovative concept of the coating is described briefly as follows: upon mechanical loading the structure and hence the coating are deformed together as a system. However, by heating the coating, the SMA elements tend to recover their experienced deformations and return to their original shape. At this point, shear forces will be developed to the interface between coating and structure. The developed shear forces are expected to mitigate the deformation of the structure and reduce the level of the stress field. The latter is a great benefit for the regions, where cracks exist, since the local reduction of the stress field will delay the crack propagation and hence the structural failure. Finally, the coating will be also followed by a system that will ensure a satisfactory cover of the metallic surface, as well as a module for assessing the effect of any structural defects that may exist.

Coordinator

CRANFIELD UNIVERSITY
United Kingdom

United Kingdom
EU contribution: EUR 603 113

Participants

PANEPISTIMIO IOANNINON
Greece

Greece
EU contribution: EUR 534 750

SECONDA UNIVERSITÀ DEGLI STUDI DI NAPOLI
Italy

Italy
EU contribution: EUR 466 000

EXIS INNOVATION LTD
United Kingdom

United Kingdom
EU contribution: EUR 391 250

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

VOXEL

Project reference: 665207
Funded under: H2020-EU.1.2.1.

volumetric medical x-ray imaging at extremely low dose

From 2015-06-01 **to** 2019-06-01, ongoing project

Project details

Total cost:	Topic(s):
EUR 3 996 875	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 996 875	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Portugal	RIA - Research and Innovation action

Objective

Computerized Tomography (CT) has been one of the greatest achievements in medical imaging, but at the cost of a high, potentially harmful, X-ray irradiation dose. The ultimate goal of VOXEL is to provide an alternative to tomography with a disruptive technology enabling 3D X-ray imaging at very low dose. VOXEL aims at prototyping new cameras that will combine the X-ray penetration and nanometre spatial resolution, easiness to use, afforded by avoiding the rotation of the source or the sample, and extremely low dose for maximum impact on medicine and biology.
VOXEL relies on the integration of trans-disciplinary fields in medical imaging, optics, X-ray physics, applied mathematics and value to society through foreseeable commercialization. VOXEL aims at prototyping in parallel a soft X-ray “water window” microscope and a hard X-ray 3D camera for medical applications. While both cameras need groundbreaking development in the underlying physics, only hard X-ray camera has high technological risk (and high societal impact). VOXEL will benefit from the soft X-ray camera thanks to its Biological applications in nano-tomography but also as a test platform for our physical and mathematical models..
The VOXEL team members are leaders in X-ray metrology, wavefront sensing, atomic physic, mathematical computing and 3D medical imaging; with VOXEL we are uniquely positioned to succeed, and to raise the competitiveness of Europe. Doing so by basing the research lead in Portugal with a woman coordinator will be exemplary: beyond the scientific and technological success, thanks to our focus in science and its valorisation, VOXEL will be transformative for scientifically emerging countries.

Coordinator

ASSOCIACAO DO INSTITUTO SUPERIOR TECNICO PARA A INVESTIGACAO E DESENVOLVIMENTO
Portugal

Portugal

EU contribution: EUR 762 500

Participants

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
France

France

EU contribution: EUR 585 000

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
France

France

EU contribution: EUR 781 250

IMAGINE OPTIC
France

France

EU contribution: EUR 718 125

UNIVERSIDAD POLITECNICA DE MADRID
Spain

Spain

EU contribution: EUR 271 250

STICHTING CENTRUM VOOR WISKUNDE EN INFORMATICA
Netherlands

Netherlands

EU contribution: EUR 437 500

CONSIGLIO NAZIONALE DELLE RICERCHE
Italy

Italy

EU contribution: EUR 441 250

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Permalink: http://cordis.europa.eu/html

ULTRAQCL

Project reference: 665158
Funded under: H2020-EU.1.2.1.

Ultrashort Pulse Generation from Terahertz Quantum Cascade Lasers

From 2015-10-01 **to** 2018-10-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 798 445	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 798 445	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
France	RIA - Research and Innovation action

Objective

The generation of ultrafast and intense light pulses is an underpinning technology across the electromagnetic spectrum enabling the study of fundamental light-matter interactions, as well as industrial exploitation in a plethora of applications across the physical, chemical and biological sciences. A benchmark system for such studies is the modelocked Ti:Sapphire laser, which has grown from being a laboratory curiosity to an essential tool in a broad range of application sectors. Beyond Ti:Sapphire systems, there have been impressive developments in semiconductor based devices for pulse generation in the optical range. These benefit from low system costs and are an enabling technology in new application domains including high speed communications.

However, in the terahertz (THz) frequency range, with its proven applications in imaging, metrology and non-destructive testing, a semiconductor based technology platform for intense and short pulse generation has yet to be realised. Ultrafast excitation of photoconductive switches or nonlinear crystals offer only low powers, low frequency modulation or broadband emission with little control of the spectral bandwidth.

In the ULTRAQCL project we will breakthrough this technological gap, using THz quantum cascade lasers (QCLs) as a foundational semiconductor device for generating intense and short THz pulses. QCLs are the only practical semiconductor system that offer gain at THz frequencies, hence making them suitable for pulse generation, with the ‘bandstructure-by-design’ nature of QCLs allowing the frequency, bandwidth and pulse width to be entirely engineered. We will demonstrate: the first self-starting (passive) mode-locked THz QCL; the first hybrid modelocked THz QCL; the first gain-switched modelocked QCL; and, the first QCL-based THz ultrafast pulse amplifier. The ULTRAQCL project will implement these radical schemes for pulse generation enabling ultrafast QCLs to become a ubiquitous technology for the THz range.

Coordinator

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
France

France
EU contribution: EUR 630 155

Participants

UNIVERSITY OF LEEDS
United Kingdom

United Kingdom
EU contribution: EUR 742 318,75

CONSIGLIO NAZIONALE DELLE RICERCHE
Italy

Italy
EU contribution: EUR 620 537,5

UNIVERSITE PARIS-SUD
France

France
EU contribution: EUR 341 138,75

UNIVERSITAET REGENSBURG
Germany

Germany
EU contribution: EUR 464 295

Last updated on 2015-06-03
Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

DIACAT

Project reference: 665085
Funded under: H2020-EU.1.2.1.

Diamond materials for the photocatalytic conversion of CO2 to fine chemicals and fuels using visible light

From 2015-07-01 **to** 2019-07-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 872 981,25	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 872 980	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Germany	RIA - Research and Innovation action

Objective

In DIACAT we propose the development of a completely new technology for the direct photocatalytic conversion of CO2 into fine chemicals and fuels using visible light. The approach utilises the unique property of man-made diamond, now widely available at low economic cost, to generate solvated electrons upon light irradiation in solutions (e.g. in water and ionic liquids). The project will achieve the following major objectives on the way to the efficient production of chemicals from CO2 :
- experimental and theoretical understanding of the principles of production of solvated electrons stemming from diamond

- identification of optimal forms of nanostructured diamond (wires, foams pores) and surface modifications to achieve high photoelectron yield and long term performance

- investigation of optimized energy up-conversion using optical nearfield excitation as a means for the direct use of sunlight for the excitation of electrons

-characterisation of the chemical reactions which are driven by the solvated electrons in “green” solvents like water or ionic liquids and reaction conditions to maximise product yields.

- demonstration of the feasibility of the direct reduction of CO2 in a laboratory environment.

The ultimate outcome of the project will be the development of a novel technology for the direct transformation of CO2 into organic chemicals using illumination with visible light. On a larger perspective, this technology will make an important contribution to a future sustainable chemical production as man-made diamond is a low cost industrial material identified to be environmentally friendly. Our approach lays the foundation for the removal and transformation of carbon dioxide and at the same time a chemical route to store and transport energy from renewable sources. This will have a transformational impact on society as whole by bringing new opportunities for sustainable production and growth.

Coordinator

JULIUS-MAXIMILIANS UNIVERSITAET WUERZBURG
Germany

Germany
EU contribution: EUR 615 125

Participants

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
France

France
EU contribution: EUR 511 495

FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
Germany

Germany
EU contribution: EUR 565 631

THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD
United Kingdom

United Kingdom
EU contribution: EUR 507 166

UPPSALA UNIVERSITET
Sweden

Sweden
EU contribution: EUR 552 000

HELMHOLTZ-ZENTRUM BERLIN FUR MATERIALIEN UND ENERGIE GMBH
Germany

Germany
EU contribution: EUR 526 563

IOLITEC IONIC LIQUIDS TECHNOLOGIES GMBH
Germany

Germany
EU contribution: EUR 320 000

GABO:MI GESELLSCHAFT FUR ABLAUFORGANISATION:MILLIARIUM MBH & CO KG
Germany

Germany
EU contribution: EUR 275 000

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Permalink: http://cordis.europa.eu/html

CHROMAVISION

Project reference: 665233
Funded under: H2020-EU.1.2.1.

Super-resolution visualisation and manipulation of metaphase chromosomes

From 2015-06-01 **to** 2019-06-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 567 025	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 567 025	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Netherlands	RIA - Research and Innovation action

Objective

CHROMAVISION aims to develop a pioneering chromosome imaging and manipulation platform that will fuel the next decades of structural chromosome research. Chromosomal abnormalities are characteristic of many disorders such as cancer, impaired fertility due to maternal aging, and neurological disorders such as fragile X syndrome. If humanity is to fully understand the wide range of diseases that are associated to errors in cell division, we must be able to further 'zoom in' on healthy and diseased chromosomes in all their complexity. The CHROMAVISION platform will allow molecular biologists to automatically isolate individual chromosomes from small tissue or cell samples and have these delivered to a super-resolution microscope. Chromosome isolation and delivery is achieved by an opto-fluidic chip that is able to trap, visualise and lyse individual cells and separate metaphase chromosomes from cell lysate. Single chromosomes can be “hand-selected” and brought into focus of the Super-Resolution Correlative Tweezers Fluorescence Microscope (CTFM-SR3D) that is developed in CHROMAVISION. This instrument will for the first time enable 3D, super-resolution, real-time metaphase chromosome observation and manipulation studies under near-physiological conditions. The technique will push the boundaries of what is currently possible in microfluidics and super-resolution microscopy and combine these into a single powerful approach for chromosome studies. Furthermore, the platform will be applied in CHROMAVISION to address key challenges in clinical and fundamental chromosome research, potentially resulting in breakthrough discoveries. Better imaging and understanding of the chromosomal mechanisms will contribute to our knowledge of the etiology of human diseases and aid drug discovery. The platform will also have large clinical value, allowing identification and monitoring of e.g. cancer heterogeneity.

Coordinator

STICHTING VU-VUMC
Netherlands

Netherlands
EU contribution: EUR 1 054 003,75

Participants

DANMARKS TEKNISKE UNIVERSITET
Denmark

Denmark
EU contribution: EUR 716 468,75

KOBENHAVNS UNIVERSITET
Denmark

Denmark
EU contribution: EUR 747 320

UNIVERSITY COLLEGE LONDON
United Kingdom

United Kingdom
EU contribution: EUR 111 732,5

LUMICKS B.V.
Netherlands

Netherlands
EU contribution: EUR 937 500

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

MRG-GRammar

Project reference: 664918
Funded under: H2020-EU.1.2.1.

Massive Reverse Genomics to Decipher Gene Regulatory Grammar

From 2015-08-01 **to** 2018-08-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 999 661	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 999 661	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Israel	RIA - Research and Innovation action

Objective

MRG-GRammar aims to devise an entirely new strategy for deciphering the regulatory rules of gene regulation. We will leverage Synthetic Biology with cutting-edge DNA synthesis technologies and high-throughput analysis to generate new types of biological datasets that systematically explore all possible regulatory landscapes rather than just the naturally occurring regulatory sequences.
The extensive and unbiased nature of these unique datasets will allow us to build new models explaining different aspects of regulatory activity, which will be tested in second-generation libraries, designed based on model predictions. Consequently, through such an iterative process, we expect to make a significant breakthrough in deciphering, and evolving, the regulatory code. Our strategy synergizes four orthogonal objectives that will form a new knowledge base from which the regulatory algorithm can be derived. We will employ our strategy on diverse model organisms from the tree of life, from single cell to whole organism: bacteria, yeast, mouse ex-vivo cells, human cell-lines and finally, whole D. melanogaster and mouse embryos.
We expect this multidisciplinary synthetic biology approach to generate a major technological advance, which will provide the community with algorithms that will not only decipher extant natural regulatory code, but also interpret variations leading to a profoundly deeper understanding of the origins of many diseases. We expect our models to also serve as a reference in designing and implementing accurate and more controllable synthetic biology devices, with applications in fuel production, healthcare and other industrial fields. Thus, our ultimate goal is to substantially accelerate the advance of technologies and knowledge related to generating systematic and personal therapeutic solutions based on the analysis of each individual's natural genomic variations.

Coordinator

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY
Israel

Israel

EU contribution: EUR 720 250

Participants

WEIZMANN INSTITUTE OF SCIENCE
Israel

Israel
EU contribution: EUR 725 023

EUROPEAN MOLECULAR BIOLOGY LABORATORY
Germany

Germany
EU contribution: EUR 1 440 000

IMPASARA Limited
United Kingdom

United Kingdom
EU contribution: EUR 189 000

AGILENT TECHNOLOGIES LDA ISRAEL LTD
Israel

Israel
EU contribution: EUR 205 500

KAROLINSKA INSTITUTET
Sweden

Sweden
EU contribution: EUR 719 888

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Permalink: http://cordis.europa.eu/html

HORIZON 2020

CompInnova

Project reference: 665238
Funded under: H2020-EU.1.2.1.

An Advanced Methodology for the Inspection and Quantification of Damage on Aerospace Composites and Metals using an Innovative Approach

From 2015-09-01 **to** 2019-03-01, ongoing project

Project details

Total cost:	Topic(s):
EUR 2 495 863	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 495 863	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
United Kingdom	RIA - Research and Innovation action

Objective

There is an innovative need for more efficient and reliable damage inspection, reducing time and cost of aircraft infrastructures, as well as maintenance-especially C and D Checks- without compromising the safety of passengers and goods transported. The CompInnova project is focused upon the development of an innovative inspection methodology, with automated and manual capabilities, for any type of composite and metallic aircraft structures. The novel structural integrity approach is comprised by three parts: a qualified Phased Array (PA) and Infrared Thermography (IRT) method attached to a mobile Vortex robot, a Damage Tolerance (DT) structural integrity assessment technique processed on a computer and an innovative repair system.

Coordinator

CRANFIELD UNIVERSITY
United Kingdom

United Kingdom
EU contribution: EUR 628 113

Participants

UNIVERSITY OF PATRAS
Greece

Greece
EU contribution: EUR 475 125

PANEPISTIMIO IOANNINON
Greece

Greece
EU contribution: EUR 512 625

LULEA TEKNISKA UNIVERSITET
Sweden

Sweden
EU contribution: EUR 501 250

EXIS INNOVATION LTD
United Kingdom

United Kingdom
EU contribution: EUR 378 750

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

Symbiotic

Project reference: 665046
Funded under: H2020-EU.1.2.1.

INNOVATIVE AUTONOMOUS ELECTRICAL BIOSENSOR SYNERGISTICALLY ASSEMBLED INSIDE A PASSIVE DIRECT METHANOL FUEL CELL FOR SCREENING CANCER BIOMARKERS

From 2015-06-01 **to** 2018-06-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 346 660	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 346 660	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Portugal	RIA - Research and Innovation action

Objective

Biosensors possess recognition elements that bind to target molecules which lead to detectable signals; they are made of two basic components: (i) a bioreceptor or biorecognition element; and (ii) a transducer element. The bioreceptor system interacts with the target analyte and this interaction is monitored by the transducer, which converts the information into a measurable effect such as an electrical, optical or mass-sensitive signal.
This project proposes the development of an autonomous electrochemical biosensor that is lightweight, disposable and low cost by using an outstanding innovative approach: hosting synergistically the bioreceptor element inside a passive direct methanol fuel cell (DMFC). Such approach will provide an electrically independent, very simple, miniaturized, autonomous electrical biosensor. The electrical dependency is eliminated by coupling the biosensor to an electrochemical transducer that is capable of autonomous energy production, the fuel cell. This work proposes a merge between electrical biosensors and fuel cells, combining the advantages of both areas of research in a single synergetic device.
In this envisaged innovative device, the electrical signal obtained from the DMFC is directly related to the concentration of the cancer biomarker in the sample analyzed. The proposed electrochemical biosensor will be completely autonomous operating at room temperature and using the oxygen present in the air, thereby allowing diagnosis everywhere.

Coordinator

INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO
Portugal

Portugal
EU contribution: EUR 836 928,75

Participants

IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE
United Kingdom

United Kingdom
EU contribution: EUR 699 311,25

UNINOVA - INSTITUTO DE DESENVOLVIMENTO DE NOVAS TECNOLOGIAS
Portugal

Portugal
EU contribution: EUR 574 475

Teknologian tutkimuskeskus VTT Oy
Finland

Finland
EU contribution: EUR 708 313,75

AARHUS UNIVERSITET
Denmark

Denmark
EU contribution: EUR 527 631,25

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

NanoSmell

Project reference: 662629
Funded under: H2020-EU.1.2.1.

NanoSmells: Artificial remote-controlled odorants

From 2015-09-01 **to** 2019-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 979 069	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 979 069	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Israel	RIA - Research and Innovation action

Objective

"Despite years of promise, an odor-emitting component in devices such as televisions, phones, computers and more has yet to be developed. Two major obstacles in the way of such development are poor understanding of the olfactory code (the link between odorant structure, neural activity, and odor perception), and technical inability to emit odors in a reversible manner. Here we propose a novel multidisciplinary path to solving this basic scientific question (the code), and in doing so generate a solution to the technical limitation (controlled odor emission). The Bachelet lab will design DNA strands that assume a 3D structure that will specifically bind to a single type of olfactory receptor and induce signal transduction. These DNA-based ""artificial odorants"" will be tagged with a nanoparticle that changes their conformation in response to an external electromagnetic field. Thus, we will have in hand an artificial odorant that is remotely switchable. The Hansson lab will use tissue culture cells expressing insect olfactory receptors, functional imaging, and behavioral tests to validate the function and selectivity of these switchable odorants in insects. The Carleton lab will use imaging in order to investigate the patterns of neural activity induced by these artificial odorants in rodents. The Sobel lab will apply these artificial odorants to the human olfactory system, and measure perception and neural activity following switching the artificial smell on and off. Finally, given a potential role for olfactory receptors in skin, the Del Rio lab will test the efficacy of these artificial odorants in promoting wound healing. At the basic science level, this approach may allow solving the combinatorial code of olfaction. At the technology level, beyond novel pharmacology, we will provide proof-of-concept for countless novel applications ranging from insect pest-control to odor-controlled environments and odor-emitting devices such as televisions, phones, and computers."

Coordinator

WEIZMANN INSTITUTE OF SCIENCE
Israel

Israel
EU contribution: EUR 1 019 156

Participants

BAR ILAN UNIVERSITY
Israel

Israel

EU contribution: EUR 892 219

MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.
Germany

Germany

EU contribution: EUR 844 610

UNIVERSITE DE GENEVE
Switzerland

Switzerland

EU contribution: EUR 713 524

UNIVERSIDAD CARLOS III DE MADRID
Spain

Spain

EU contribution: EUR 509 560

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

LiNaBioFluid

Project reference: 665337
Funded under: H2020-EU.1.2.1.

Laser-induced Nanostructures as Biomimetic Model of Fluid Transport in the Integument of Animals

From 2015-07-01 **to** 2018-07-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 024 827,5	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 024 827	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Greece	RIA - Research and Innovation action

Objective

The integument of an animal body has various functions, which are often achieved by specific micro- and/or nano-hierarchical structures. Examples are the very low water friction and air retention of water spiders or the swim fern of salvinia and the outstanding adhesion properties of geckos. In this project, we will employ advanced laser-processing strategies based on self-organization, to mimic the specific topography and the excellent wetting properties of the integument of bark bugs and moisture harvesting lizards resulting from adaptations to their environment. Flat bark bugs darken during rain fall due to a super-wettable body surface with capillaries out of which water spreads onto plain areas of the bug. For moisture harvesting in lizards wettability takes place in opposed direction, i.e. from plain areas into a capillary network on the skin. A fast and directional transport results from a special geometry of capillaries. Thus as general objective we want to test whether both effects, i.e. fast capillary transport (lizard) and liquid spreading onto plain areas (bark bugs), can be combined by optimized structures with hierarchical geometry. The outcome of this innovative biomimetic exploitation of wetting effects is expected to lead to a radically new technological approach of laser-generated surface textures on micro- and nanometer scale. Especially for control of friction and wear in liquids, leveraging new results can be expected, e.g. for developing slide bearings. The extension of surface structures over large areas is feasible. Thus, laser-fabrication of biomimetic surfaces with extreme wetting properties can be also anticipated in further applications, e.g. lubrication, water and oil separation, reduced drag in underwater applications, high power device cooling. All related to an innovative and sustainable reduction of CO_2 emission.

Coordinator

FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS
Greece

Greece

EU contribution: EUR 492 250

Participants

AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS
Spain

Spain

EU contribution: EUR 390 082,5

UNIVERSITAT LINZ
Austria

Austria

EU contribution: EUR 533 007,5

RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
Germany

Germany

EU contribution: EUR 422 625

BUNDESANSTALT FUER MATERIALFORSCHUNG UND -PRUEFUNG
Germany

Germany

EU contribution: EUR 428 750

FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
Germany

Germany

EU contribution: EUR 484 096

HIGH TECH COATINGS GMBH
Austria

Austria

EU contribution: EUR 274 016

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

RECORD-IT

Project reference: 664786
Funded under: H2020-EU.1.2.1.

Reservoir Computing with Real-time Data for future IT

From 2015-09-01 **to** 2018-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 4 193 147,5	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 4 193 147,25	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Sweden	RIA - Research and Innovation action

Objective

The aim of this proposal is to develop an intelligent biocompatible sensing device which detects complex behavioural changes in ion concentrations. The sensor will use wet NOMFETs, coated Si nanowires, self-conjugated polymers, arrays of photocells, flow of lipids. The level of ions will be measured by monitoring changes in the response function of the system. The high sensitivity of the device will be achieved by ensuring a strong coupling between the environment and the device. The key research challenges will be: accessing the feasibility of the idea to use reservoir computing for sensing complex environmental changes, identifying suitable integration strategies for the components, optimizing the sets of input/output pairs (response functions) and the device components for enhanced sensitivity.

Coordinator

CHALMERS TEKNISKA HOEGSKOLA AB
Sweden

Sweden
EU contribution: EUR 917 205

Participants

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
France

France
EU contribution: EUR 672 160

UNIVERSITAT BASEL
Switzerland

Switzerland
EU contribution: EUR 577 031

AKADEMIA GORNICZO-HUTNICZA IM. STANISLAWA STASZICA W KRAKOWIE
Poland

Poland

EU contribution: EUR 399 000

THE HEBREW UNIVERSITY OF JERUSALEM
Israel

Israel

EU contribution: EUR 594 840

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
France

France

EU contribution: EUR 396 573,75

TECHNISCHE UNIVERSITAET DRESDEN
Germany

Germany

EU contribution: EUR 286 875

RUDER BOSKOVIC INSTITUTE
Croatia

Croatia

EU contribution: EUR 349 462,5

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Permalink: http://cordis.europa.eu/html

IBSEN

Project reference: 662725
Funded under: H2020-EU.1.2.1.

Bridging the gap: from Individual Behaviour to the Socio-tEchnical MaN

From 2015-09-01 **to** 2018-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 663 237,75	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 663 237,25	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

Developing models of real-world societal scenarios and systems is a key topic in the research agenda of social sciences, but is hindered by the lack of controlled experimentation with large groups of people. IBSEN will provide a breakthrough by building a repertoire of human behaviour in large (1000+ persons) structured groups using controlled experiments. To that end, we will develop a novel setup for large groups of people that will provide an experimental protocol, the necessary software and analytical tools to allow us to deal with thousands of people at the same time. We will apply our setup to specific research questions, focusing on novel phenomenology that may arise in large systems as compared to typical smaller ones, to find the rules that govern human behaviour in those cases, including the influence of social context and individual identity on them. We will assess our approach by building a model of human interaction in groups based on the behavioural rules we have found. The project requires a high-degree of interdisciplinarity; accordingly, the team consists of physicists, economists, social psychologists, and computer scientists. On the other hand, this is a high-risk project, as the experimental design may prove unfeasible for really large systems and extracting meaningful data from the participants' actions may not be possible. Notwithstanding, encouraging results in some pilot studies run by partners underpin the scientific feasibility of the concept and approach. If successful, researchers will be able to build on our findings to develop a human behaviour simulator, a technology providing a basis for socio-economic simulations that would radically change many fields, from robotics to economics, with technological and societal impacts, including policy-making in socially pressing issues. We will thus lay the foundations to kick start a new way of doing social science for the problems arising in a technologically highly connected society.

Coordinator

UNIVERSIDAD CARLOS III DE MADRID
Spain

Spain
EU contribution: EUR 478 178,75

Participants

UNIVERSIDAD DE ZARAGOZA
Spain

Spain
EU contribution: EUR 350 000

THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD
United Kingdom

United Kingdom
EU contribution: EUR 321 298,75

THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE
United Kingdom

United Kingdom
EU contribution: EUR 338 488,75

UNIVERSITEIT VAN AMSTERDAM
Netherlands

Netherlands
EU contribution: EUR 400 001

AALTO-KORKEAKOULUSAATIO
Finland

Finland
EU contribution: EUR 386 984

UNIVERSITAT DE VALENCIA
Spain

Spain
EU contribution: EUR 388 286

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Permalink: http://cordis.europa.eu/html

MAGicSky

Project reference: 665095
Funded under: H2020-EU.1.2.1.

Magnetic Skyrmions for Future Nanospintronic Devices

From 2015-09-01 **to** 2018-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 396 439,6	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 396 439,1	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
France	RIA - Research and Innovation action

Objective

Challenges facing technology for power efficient, high density, high speed information processing and storage are well recognised, and strategies for meeting them in the short term define the shape of industry roadmaps. As a consequence, in the next ten years, radically new approaches will be implemented and will transform how data is stored and manipulated. Skyrmion-based devices are newcomers to this global race for the next generations of information technology. Skyrmions were discovered in magnetic crystals only a few years ago, but we already have within reach a possibility to create them in nanoscale devices that can be made compatible with conventional integrated circuit technology. Our work in MAGicSky will substantiate this possibility.
The potential benefits are enormous. Skyrmions are magnetic solitons that carry information, and are remarkably robust against defects that can trap or destroy them due to the topology of their magnetic texture. Topology also appears to further underlie other of their technologically important features: mobility with small continuous currents and singular dynamics under radio-frequency. MAGicSky will engage some of the most advanced materials fabrication, characterisation and microscopic imaging facilities in Europe together with leading theoretical and computational modelling capabilities, to create the first proof-of-concept room temperature spintronic devices based on magnetic skyrmions.

Coordinator

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
France

France
EU contribution: EUR 687 018,35

Participants

UNIVERSITAET HAMBURG
Germany

Germany
EU contribution: EUR 606 000

UNIVERSITY OF LEEDS
United Kingdom

United Kingdom
EU contribution: EUR 652 007

UNIVERSITY OF GLASGOW
United Kingdom

United Kingdom
EU contribution: EUR 574 243,75

FORSCHUNGSZENTRUM JULICH GMBH
Germany

Germany
EU contribution: EUR 318 332,5

CHRISTIAN-ALBRECHTS-UNIVERSITAET ZU KIEL
Germany

Germany
EU contribution: EUR 300 000

PAUL SCHERRER INSTITUT
Switzerland

Switzerland
EU contribution: EUR 258 837,5

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Permalink: http://cordis.europa.eu/html

NEMF21

Project reference: 664828
Funded under: H2020-EU.1.2.1.

Noisy Electromagnetic Fields - A Technological Platform for Chip-to-Chip Communication in the 21st Century

From 2015-10-01 **to** 2018-10-01, ongoing project

Project details

Total cost:	Topic(s):
EUR 3 419 637,5	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 419 637,25	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
United Kingdom	RIA - Research and Innovation action

Objective

Wireless Chip-to-Chip (C2C) communication and wireless links between printed circuit boards operating as Multiple Input Multiple Output devices need to become dominant features of future generations of integrated circuits and chip architectures. They will be able to overcome the information bottleneck due to wired connections and will lead the semiconductor industry into a new More-Than-Moore era. Designing the architecture of these wireless C2C networks is, however, impossible today based on standard engineering design tools. Efficient modelling strategies for describing noisy electromagnetic fields in complex environments are necessary for developing these new chip architectures and wireless interconnectors. Device modelling and chip optimization procedures need to be based on the underlying physics for determining the electromagnetic fields, the noise models and complex interference pattern. In addition, they need to take into account input signals of modern communication systems being modulated, coded, noisy and eventually disturbed by other signals and thus extremely complex.
Recent advances both in electrical engineering and mathematical physics make it possible to deliver the breakthroughs necessary to enable this future emerging wireless C2C technology by creating a revolutionary electromagnetic field simulation toolbox. Increasingly sophisticated physical models of wireless interconnects and associated signal processing strategies and new insight into wave modelling in complex environments based on dynamical systems theory and random matrix theory make it possible to envisage wireless communication on a chip level. This opens up completely new pathways for chip design, for carrier frequency ranges as well as for energy efficiency and miniaturisation, which will shape the electronic consumer market in the 21st century.

Coordinator

THE UNIVERSITY OF NOTTINGHAM
United Kingdom

United Kingdom
EU contribution: EUR 851 425

Participants

TECHNISCHE UNIVERSITAET MUENCHEN
Germany

Germany
EU contribution: EUR 821 016

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
France

France
EU contribution: EUR 590 313,75

INSTITUT SUPERIEUR DE L'AERONAUTIQUE ET DE L'ESPACE
France

France
EU contribution: EUR 156 722,5

IMST GMBH
Germany

Germany
EU contribution: EUR 606 250

NXP SEMICONDUCTORS FRANCE SAS
France

France
EU contribution: EUR 393 910

Last updated on 2015-06-02
Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

ABIOMATER

Project reference: 665440
Funded under: H2020-EU.1.2.1.

Magnetically actuated bio-inspired metamaterials

From 2015-11-01 **to** 2018-11-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 978 882,69	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 978 882,5	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
United Kingdom	RIA - Research and Innovation action

Objective

This project will deliver a new class of metamaterials whose functionality can be controlled by external magnetic fields. The materials consist of micromotors, comprising an anisotropically “hard” and “soft” ferromagnetic particle pair embedded in a polymer matrix, and promise wide-ranging technological applications. The project, involves 5 partners with expertise in experimental and theoretical physics, biological science and technology. Building upon a detailed analysis of the physical properties of the individual motors, and their dependency on their magnetic and material properties, the team will develop methods for incorporating the motors into elastic membranes (MEMs). We shall analyse the mechanical and optical properties of these constructs and the ways in which they can be modulated by the external magnetic fields. These novel properties will then be used to produce prototype devices:
• Pumps for fluids and tuneable filters for dissolved solutes, operating down to microscopic length scales and based on magnetically driven membrane deformation and changes in internal pore structure.
• Tuneable optical devices such as lenses and filters based on magnetic strain-induced changes in the optical and photonic properties of the constructs.
• Substrates for biotechnology, tissue engineering and regenerative medicine. These devices will be based on our ability to apply to cells in culture the patterns of temporally and spatially varying strain fields to which they are exposed in vivo and which maintain their phenotype and metabolic activity.
The prototypes will find immediate applications in expanding areas of technology ranging from lab-on-a-chip systems to biomedical implants. They will also help the team to develop a thorough understanding of the novel emergent properties of the MEMs leading, in turn to many other applications.

Coordinator

THE UNIVERSITY OF EXETER
United Kingdom

United Kingdom
EU contribution: EUR 688 878,75

Participants

THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD
United Kingdom

United Kingdom
EU contribution: EUR 590 220

PLATFORM KINETICS LIMITED
United Kingdom

United Kingdom
EU contribution: EUR 524 780

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
France

France
EU contribution: EUR 603 128,75

UNIVERSITAT DE BARCELONA
Spain

Spain
EU contribution: EUR 571 875

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

QCUMbER

Project reference: 665148
Funded under: H2020-EU.1.2.1.

Quantum Controlled Ultrafast Multimode Entanglement and Measurement

From 2015-09-01 **to** 2018-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 219 721,25	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 219 721,25	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
United Kingdom	RIA - Research and Innovation action

Objective

Ultrafast light pulses offer the fascinating opportunity to study system dynamics at ultrashort time scales. Trains of ultrafast light pulses also feature a broad frequency comb structure that has been exploited e.g. in high precision metrology. These characteristics have made ultrafast optics with coherent control techniques a flourishing field in recent years. A rich toolbox has been developed to generate shorter pulses with engineered temporal and spectral properties.
Likewise, exploiting quantum features of light has enabled remarkable progress for the experimental exploration of fundamental physics and has been central to establishing the fields of quantum communication and quantum metrology. This proposal aims to bring together these two vibrant fields with the goal of exploring new capabilities that arise from the interplay of the quantum properties of light at extreme timescales and over extremely broad spectra. Ultrafast quantum pulses feature an inherent non-classical pulse-mode or supermode structure, which is imprinted onto the states in the generation process and is closely related to the entanglement properties between different frequency constituents of the quantum pulses. Harnessing this structure will dramatically enhance quantum channel capacities per signal state, enable precision time-frequency measurements beyond classical boundaries and open new avenues to scalable quantum information processing.
Each partner brings unique expertise from the areas of quantum information, ultrafast and quantum optics, which expands the combined knowledge of the consortium. The partners' research profiles cover engineered integrated optics with pulsed light, quantum communication systems, coherent control of light matter interaction and continuous variable quantum states. Experience in classical ultrafast pulse-shaping as well as advanced theoretical analysis tools addressing high-dimensional entanglement and multimode photon statistics round out the consortium.

Coordinator

THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD — United Kingdom
United Kingdom
EU contribution: EUR 896 221,25

Participants

UNIVERSITE PIERRE ET MARIE CURIE - PARIS 6
France

France
EU contribution: EUR 617 237,5

UNIVERSITAET PADERBORN
Germany

Germany
EU contribution: EUR 619 250

UNIVERSITE DES SCIENCES ET TECHNOLOGIES DE LILLE - LILLE I
France

France
EU contribution: EUR 400 102,5

UNIVERSITAET ROSTOCK
Germany

Germany
EU contribution: EUR 416 875

UNIVERSITA DEGLI STUDI ROMA TRE
Italy

Italy
EU contribution: EUR 270 035

Last updated on 2015-06-03
Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

Phoenix

Project reference: 665347
Funded under: H2020-EU.1.2.1.

Exploring the Unknown through Reincarnation and Co-evolution

From 2015-10-01 **to** 2019-10-01, ongoing project

Project details

Total cost:	Topic(s):
EUR 3 632 486,25	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 632 486,25	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Netherlands	RIA - Research and Innovation action

Objective

Humans have been exploring the world from the depths of the oceans to the edges of the universe. Yet many environments remain inaccessible, even to modern cutting-edge technology. Therefore problems like exploring the status of waste water under the Fukushima reactor, or discover suitable sites for underground CO2 storage remain unsolved.

Our aim is to investigate a new line of technology that will enable the exploration of difficult-to-access environments exploiting a risky, highly-novel approach called PHOENIX.

PHOENIX will accomplish the exploration of inaccessible environments with physical agents that are extremely limited in size and resources, and can operate without direct control over software and hardware. PHOENIX starts with processing a user question, then assesses available knowledge and initiates an evolutionary process involving two nested generational loops. In the outer loop PHOENIX develops, deploys and retrieves physical agents capable of penetrating the inaccessible environment and gathering information. Based on this knowledge, a model of the unknown environment is developed and evaluated. This model is refined in the inner loop, where environmental models and abstract representations of the physical agents (virtual agents) co-evolve in a virtual world until an improved generation of physical agents is ready for deployment. The goal of this co-evolution is to maximize the information captured about the unknown environment by progressively optimized agents.

Our main objectives are: the development of a co-evolutionary framework, the design of versatile agent technology and the development of a dedicated human interface.

PHOENIX is a radically new, high risk/high reward project. It also holds the promise to shed light on emergent properties of self-organization, local adaptation and division of labour in autonomous systems. The high societal benefits, foundational character and long-term focus make PHOENIX a perfect fit for the FET programme.

Coordinator

TECHNISCHE UNIVERSITEIT EINDHOVEN
Netherlands

Netherlands
EU contribution: EUR 1 052 955

Participants

KATHOLIEKE UNIVERSITEIT LEUVEN
Belgium

Belgium
EU contribution: EUR 880 750

RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
Germany

Germany
EU contribution: EUR 823 318,75

INCAS 3
Netherlands

Netherlands
EU contribution: EUR 875 462,5

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

Zoterac

Project reference: 665107
Funded under: H2020-EU.1.2.1.

Zinc Oxide For TeraHertz Cascade Devices

From 2015-09-01 **to** 2019-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 795 877,44	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 795 876,94	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
France	RIA - Research and Innovation action

Objective

The terahertz (THz) spectral region, located between the infrared and the microwave regions, is known as “the THz gap” because of the lack of compact semiconductor devices. This spectral domain is currently intensively explored in view of its potential for medical diagnostics, security screening, trace molecule sensing, astronomical detection, space-borne imaging, non-invasive quality control or wireless communications. A prerequisite for public-domain applications to emerge in the strategic THz frequency range is the availability of compact size semiconductor sources operating at room temperature, which is out of range of the current technology based on GaAs quantum cascade lasers. ZOTERAC proposes a disruptive approach based on ZnO-based nano-engineered semiconductors in order to realize THz emitters operating at room-temperature with milliWatt output power capability as well as THz quantum detectors with unprecedented large operating temperatures. These devices are based on the quantum cascade concept and take benefit of the large optical phonon energy of ZnO (twice that of GaAs) for achieving high temperature operation. Establishing a new state-of-the-art for the design, growth and processing of ZnO/ZnMgO heterostructures, and developing an advanced know-how on oxide-based devices are major challenges of the project. The consortium regroups world–class academic experts on ZnO technologies, quantum cascade lasers and detectors as well as THz optoelectronics. The strategies have been chosen based on a careful assessment of the risk attached to all tasks and achievement of targeted objectives at each stage of the project. This project which implies a strong expertize in basic physics, chemistry and engineering, is expected to generate high impacts in terms of scientific and technological achievements.

Coordinator

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
France

France

EU contribution: EUR 1 532 742,44

Participants

UNIVERSITE PARIS-SUD
France

France
EU contribution: EUR 306 251

UNIVERSIDAD POLITECNICA DE MADRID
Spain

Spain
EU contribution: EUR 698 871

TECHNISCHE UNIVERSITAET WIEN
Austria

Austria
EU contribution: EUR 631 937,5

EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH
Switzerland

Switzerland
EU contribution: EUR 626 075

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Permalink: http://cordis.europa.eu/html

nuClock

Project reference: 664732
Funded under: H2020-EU.1.2.1.

Towards a nuclear clock with Thorium-229

From 2015-06-01 **to** 2019-06-01, ongoing project

Project details

Total cost:	Topic(s):
EUR 3 970 327,5	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 970 327,5	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Austria	RIA - Research and Innovation action

Objective

Atomic clocks are the backbone of our modern communication and navigation technology, e.g. through the global positioning system (GPS). Improving these clocks will open up exciting new applications in geodesy, fleet tracking, autonomous vehicles, augmented reality and shed light on some of the most fundamental questions in research.

Today's best atomic clocks lose only 1 second in 30 billion years, making them the most precise measurement devices ever built. However, such clocks are extremely delicate and susceptible to external perturbations; they can only be operated in specialized laboratories.

We propose to develop a novel type of clock, based on a unique nuclear transition in Thorium-229. This nuclear clock will be fundamentally different from existing atomic clocks, which are based on transitions in the electron shell. It will be largely inert to perturbations, simpler by design, and holds the potential to outperform existing atomic clocks in terms of precision.
So far, progress towards an application of the Thorium nuclear transition has been hampered by the extreme technological challenges related to the scarcity of 229Th, insufficient detector resolution, and exotic lasers frequencies. Suitable technology is only becoming available just now. Furthermore, this research demands supreme expertise in a variety of fields, encompassing nuclear and atomic physics, quantum optics, metrology, as well as detector- and laser technology. Our interdisciplinary consortium is assembled to precisely match these requirements, joining for the first time Europe's leading research groups in the respective fields.

The work will focus on two objectives; (i) finding clear evidence of the transition and measuring its frequency, and (ii) developing all key components required for operation of a nuclear clock. We are certain that next-generation satellite-based navigation technology and other precision timing applications will greatly benefit from more precise and robust clocks.

Coordinator

TECHNISCHE UNIVERSITAET WIEN
Austria

Austria
EU contribution: EUR 900 000

Participants

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT
Germany

Germany
EU contribution: EUR 656 250

LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN
Germany

Germany
EU contribution: EUR 606 250

RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG
Germany

Germany
EU contribution: EUR 288 750

JYVASKYLAN YLIOPISTO
Finland

Finland
EU contribution: EUR 247 827,5

MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.
Germany

Germany
EU contribution: EUR 327 500

TOPTICA PHOTONICS AG
Germany

Germany
EU contribution: EUR 943 750

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Permalink: http://cordis.europa.eu/html

HELENIC-REF

Project reference: 665318
Funded under: H2020-EU.1.2.1.

Hybrid Electric Energy Integrated Cluster concerning Renewable Fuels

From 2015-06-01 **to** 2018-06-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 578 386	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 578 386	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Greece	RIA - Research and Innovation action

Objective

The targeted breakthrough of the HELENIC-REF project refers to the establishment of a new sustainable methodology for the water thermolysis at temperatures below 300oC and the immediate corresponding production of energy or fuels. The method is based on our preliminary experimental evidence of water thermolysis at 286oC in the presence of Fe3O4 nanoporous catalytic thick films, with the sustainable maintenance of the catalyst due to a new reduction method based on Lorentz force electrons generated by a magnetic field in the vicinity of the electric current heating the semiconducting catalyst. The method is used for the production of hydrogen and oxygen, as well as of fuels in the presence of CO2 in order to reduce CO2 to CO or even to hydrocarbons, (like Synthetic Natural Gas – SNG) via methanation.

Coordinator

NATIONAL TECHNICAL UNIVERSITY OF ATHENS - NTUA
Greece

Greece
EU contribution: EUR 753 375

Participants

SECONDA UNIVERSITÀ DEGLI STUDI DI NAPOLI
Italy

Italy
EU contribution: EUR 553 500

CRANFIELD UNIVERSITY
United Kingdom

United Kingdom
EU contribution: EUR 610 011

FYZIKALNY USTAV SLOVENSKEJ AKADEMIE VIED
Slovakia

Slovakia
EU contribution: EUR 444 000

EXIS INNOVATION LTD
United Kingdom

United Kingdom
EU contribution: EUR 217 500

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

2D-INK

Project reference: 664878
Funded under: H2020-EU.1.2.1.

Redesigning 2D Materials for the Formulation of Semiconducting Inks

From 2016-01-01 **to** 2019-01-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 962 661	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 962 661	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Spain	RIA - Research and Innovation action

Objective

2D-INK is targeted at developing inks of novel 2D semiconducting materials for low-cost large-area fabrication processes on insulating substrates through a new methodology, which will exceed the properties of state-of-the-art graphene- and graphene oxide based inks. Achieving this would represent an important step forward in the processing of 2D semiconducting materials and will provide the key parameters for fabricating the next generation of ultrathin electronic appliances.
The inherent high-risk of 2D-INK is countered by a strongly interdisciplinary research team composed of 9 partners (8 academics + 1 SME) with demonstrated experience in their corresponding fields and with different yet highly complementary backgrounds. Therefore only together and in synergy they will be able to address the challenges of the multiple research and innovation aspects of 2D-INK that cover the entire value chain from materials design and synthesis, characterisation, formulation and processing to device implementation.
In addition 2D-INK has the potential to revolutionise research on 2D semiconducting materials way beyond the current interests on synthesis (high impact), since the efficient dispersion and formulation of 2D semiconducting materials into inks enables the applications of 2D semiconducting materials over different scientific and technological disciplines, such as electronics, sensing, photonics, energy storage and conversion, spintronics, etc.
Overall, 2D-INK addresses perfectly the challenge of this call as it is an archetype of an early stage, high risk visionary science and technology collaborative research project that explores radically new manufacturing and processing technologies for novel 2D semiconducting materials.

Coordinator

UNIVERSIDAD DEL PAIS VASCO/ EUSKAL HERRIKO UNIBERTSITATEA
Spain

Spain
EU contribution: EUR 665 416

Participants

UNIVERSIDADE DO MINHO
Portugal

Portugal
EU contribution: EUR 244 250

UNIVERSITAT DE VALENCIA
Spain

Spain
EU contribution: EUR 324 548,75

TECHNISCHE UNIVERSITAET MUENCHEN
Germany

Germany
EU contribution: EUR 322 250

KATHOLIEKE UNIVERSITEIT LEUVEN
Belgium

Belgium
EU contribution: EUR 302 000

UNIVERSITAT WIEN
Austria

Austria
EU contribution: EUR 323 940

THE UNIVERSITY OF NOTTINGHAM
United Kingdom

United Kingdom
EU contribution: EUR 271 406,25

Asociacion - Centro de Investigacion Cooperativa en Nanociencias - CIC NANOGUNE
Spain

Spain
EU contribution: EUR 297 600

Graphenea S.A.
Spain

Spain
EU contribution: EUR 211 250

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Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

Microflusa

Project reference: 664823
Funded under: H2020-EU.1.2.1.

Fabricating colloidal materials with microfluidics

From 2015-09-01 **to** 2019-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 027 637,5	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 3 027 637,5	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
France	RIA - Research and Innovation action

Objective

In the field of colloidal science, much progress has been done on the synthesis of complex building blocks mimicking molecular structures with the hope of elaborating innovative materials. However, in the present state of the art, the rates at which these building blocks are obtained are exceedingly small. As a consequence, even though theoretically, revolutionary materials can be imagined, throughputs are far too low to approach industrial applications. We propose to unlock this bottleneck with microfluidic technology.
The starting point is the discovery (by ESPCI) of a new hydrodynamic mechanism that reorganizes droplets clusters into well-defined configurations during their transport in microchannels. In this work, the monodisperse production, at high rates, of a variety of anisotropic clusters (triangles, tetrahedrons etc.), has been demonstrated. Our objective is to deepen and harness this mechanism by transforming, under high throughput conditions, such clusters into solid and stable building blocks that self-assemble into functional materials. Rates of production of one million of building blocks per second are feasible. This would open new avenues in the field of material sciences and pave the way towards an industrial production of revolutionary colloidal materials. The project clearly focuses on this goal, by bringing together outstanding teams with complementary expertise: Microfluidics & Chemistry (ESPCI), Hydrodynamic theory & Condensed Matter Physics (Technion), Numerical Simulations (KTH). The WPs include the chemical synthesis of surfactants, high throughput production of building blocks, their crystallization into functional materials, emphasizing on photonic band gap materials, characterized numerically by Technion. Fundamentally important, work will be tightly linked to theoretical analysis and numerical simulations and will benefit from market studies made by a SME.

Coordinator

FONDATION PIERRE-GILLES DE GENNES POUR LA RECHERCHE
France

France

EU contribution: EUR 387 500

Participants

REGIE ECOLE SUPERIEURE DE PHYSIQUE ET DE CHIMIE INDUSTRIELLE
France

France

EU contribution: EUR 1 081 250

KUNGLIGA TEKNISKA HOEGSKOLAN
Sweden

Sweden

EU contribution: EUR 708 887,5

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY
Israel

Israel

EU contribution: EUR 700 000

RTD TALOS LIMITED
Cyprus

Cyprus

EU contribution: EUR 150 000

Last updated on 2015-06-02
Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

CONQUER

Project reference: 665172
Funded under: H2020-EU.1.2.1.

Contrast by Quadrupole Enhanced Relaxation

From 2015-09-01 **to** 2018-09-01, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 463 975	FETOPEN-RIA-2014-2015
EU contribution:	**Call for proposal:**
EUR 2 463 975	H2020-FETOPEN-2014-2015-RIA
Coordinated in:	**Funding scheme:**
Austria	RIA - Research and Innovation action

Objective

The ageing society and demographic change is one of the major challenges which Europe is facing now, and even more so in the future. Mastering this challenge requires radically new diagnostic and therapeutic treatments as key factors in achieving the healthy well-being of European citizens. Molecular imaging (MI) plays a pivotal role in diagnosis, understanding of disease and in the development of effective treatments.
CONQUER will explore a fundamentally new contrast mechanism with the potential to push magnetic resonance imaging (MRI) far beyond its limits towards a powerful MI modality. This will be achieved by exploiting the cross relaxation between 1H and large quadrupolar nuclei (QN) for contrast agent (CA) design. The main objective is to synthesize bio-compatible QN compounds and nano-particles (NPs), high efficiency and manifold degrees of freedom in the design of smart properties, such as the ability to switch the contrast on and off by changing the magnetic field or chemical binding (e.g. targeting). The NPs will be tailored based on quantum-mechanical simulations. Sensitivity and contrast switching will be demonstrated with MRI in cell cultures. This highly interdisciplinary project combines expertise in quantum physics, chemical and biomedical engineering, material characterisation as well as nanotoxicology.
Today, European scientists and companies are already leading global players in CA development. CONQUER will significantly fertilise this field and lay the scientific foundations for a new technology by providing theoretical groundwork, synthesis guidelines, imaging instrumentation and toxicological references. These results will be actively transferred to academia and industry as well in order to strengthen European competitiveness. The combination of a so far unexploited quantum-mechanical phenomenon and cutting-edge imaging technologies has the potential to create MI solutions with significant impact.

Coordinator

TECHNISCHE UNIVERSITAET GRAZ
Austria

Austria
EU contribution: EUR 1 231 250

Participants

UNIWERSYTET WARMINSKO MAZURSKI W OLSZTYNIE
Poland

Poland

EU contribution: EUR 472 500

UNIVERZA V MARIBORU
Slovenia

Slovenia

EU contribution: EUR 584 125

UMEA UNIVERSITET
Sweden

Sweden

EU contribution: EUR 83 750

MEDIZINISCHE UNIVERSITAT GRAZ
Austria

Austria

EU contribution: EUR 92 350

Last updated on 2015-06-02
Retrieved on 2016-01-31

Permalink: http://cordis.europa.eu/html

LISTE DES PROJETS FET-OPEN 2014-2015
REFERENCES DANS CORDIS AU 4 FEVRIER 2016

PROSEQO	PROtein SEQuencing using Optical single molecule real-time detection
BREAKBEN	Breaking the Nonuniqueness Barrier in Electromagnetic Neuroimaging
MARA	Molecular Analytical Robotics Assays
SUPERTWIN	All Solid-State Super-Twinning Photon Microscope
LIAR	Living Architecture
CellViewer	A cell viewer: super-resolution systems microscopy to assess pluripotency and differentiation of stem
FutureAgriculture	Transforming the future of agriculture through synthetic photorespiration
GOTsolar	New technological advances for the third generation of Solar cells
MSmed	Mass spectrometric technology for next generation proteomics in systems medicine
MAGNEURON	Hijacking cell signalling pathways with magnetic nanoactuators for remote-controlled stem cell therapies of neurodegenerative disorders

HORIZON 2020

PROSEQO

Project reference : 687089
Funded under : H2020-EU.1.2.1.

PROtein SEQuencing using Optical single molecule real-time detection

From 2016-03-01 **to** 2019-02-28, Grant Agreement signed

Project details

Total cost:	**Topic(s):**
EUR 2 906 801,25	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 2 906 801,25	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Italy	**Funding scheme:**
	RIA - Research and Innovation action

Objective

The advent of analytical techniques with extremely low limits of detection has led to dramatic progresses mostly in the field of

nucleic acids sequencing. Despite the advent of the next generation sequencing platforms, the current genome sequencing task remains formidable, and revolutionary advances in DNA sequencing technology are still demanded. Nevertheless, the primary actors in virtually all life processes are the proteins coded by DNA sequences known as genes. Proteins can yield far more compelling revelations than may be gleaned from DNA alone. Protein sequencing may radically transform patient treatment, enabling precise monitoring of disease response to therapeutics at the molecular level. Single-molecule sequencing of proteins is of enormous value, offering the potential to detect diminishingly small quantities of proteins that may have been altered by alternative splicing or post-translational modification. In this project, we build upon current state-of-the-art sequencing technologies to develop novel proof-of-principle technologies for high-throughput protein sequencing and single molecule DNA/RNA sequencing. The work proposed herein will provide: (i) a new sequencing technology development that utilizes plasmonic nanostructures in order to enhance the optical detection and to control the molecules movement by means of optical trapping; (ii) a novel approach of plasmonic based optical spectroscopy for sequencing of protein; (iii), a rigorous analytical model to reconstruct the exact sequence from the signals recorded; and (iv) a plasmonic device that can perform both nucleic acids and amino-acids sequencing in one functional unit. These research efforts provide a foundation for the novel use of systems for a wide range of applications, such as the framework to investigate next generation protein sequencing, as well as high-throughput DNA sequencing and genetic diagnostics.

Coordinator

FONDAZIONE ISTITUTO ITALIANO DI TECNOLOGIA

Italy

EU contribution: EUR 811 663,75

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16163 GENOVA

Italy

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France

EU contribution: EUR 709 708,75

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91405 ORSAY CEDEX

France

UNIVERSITAT DE BARCELONA

Spain

EU contribution: EUR 649 643,75

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08007 BARCELONA

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ALACRIS THERANOSTICS GMBH

Germany

EU contribution: EUR 374 625

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EU contribution: EUR 361 160

VIA SVIZZERA 16

35127 PADOVA

Italy

Last updated on 2015-11-04

Retrieved on 2016-02-04

Permalink : http://cordis.europa.eu/project/rcn/199037_en.html

BREAKBEN

Project reference : 686865
Funded under : H2020-EU.1.2.1.

Breaking the Nonuniqueness Barrier in Electromagnetic Neuroimaging

From 2016-01-01 **to** 2018-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 998 793	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 3 998 793	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Finland	**Funding scheme:**
	RIA - Research and Innovation action

Objective

By combining accurate magnetic measurements of neural activity with near-simultaneous high-definition measurements of cerebral structure – provided by novel methods in ultra-low-field magnetic resonance imaging (ULF MRI) – we will be able to image the dynamics of human brain function at unprecedented resolution and reliability. BREAKBEN will achieve a revolution in neuroimaging; we aim at breaking the barrier for measurement of neuronal currents by ULF MRI (neural current imaging; NCI) as well as breaking the nonuniqueness barrier for magnetoencephalography (MEG) by combining it with ULF MRI and accurately presented a priori information. A key aspect in utilizing the a priori information is injected current density imaging (CDI), which will inform us about the individual conductivity structure of the head. Using novel verification and validation approaches, we will demonstrate the unique advantages of these multimodal techniques. These breakthroughs will result in completely different workflows in brain imaging, also suitable for clinical use. We believe that we are at the edge of a qualitative technology jump with ULF MRI, its applications and combinations. This will lead to a wealth of new applications and revolutionize the way we do magnetism-based measurements of the nervous system. Europe has the unique chance to lead this revolution.

Coordinator

AALTO-KORKEAKOULUSAATIO

Finland

EU contribution: EUR 853 078

OTAKAARI 1

02150 ESPOO

Finland

Participants

ELEKTA OY

Finland

EU contribution: EUR 468 245

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Finland

HELSINGIN JA UUDENMAAN SAIRAANHOITOPIIRIN KUNTAYHTYMÄ

Finland

EU contribution: EUR 239 088,75

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Germany
EU contribution: EUR 779 268,75

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Germany
TECHNISCHE UNIVERSITAET ILMENAU

Germany
EU contribution: EUR 442 871,25

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Italy
EU contribution: EUR 440 100

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Finland
EU contribution: EUR 776 141,25

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Last updated on 2016-01-20
Retrieved on 2016-02-04
Permalink : http://cordis.europa.eu/project/rcn/199029_en.html

MARA

Project reference : 686647
Funded under : H2020-EU.1.2.1.

Molecular Analytical Robotics Assays

From 2015-12-01 **to** 2019-11-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 996 477,5	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 3 996 477,5	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Austria	**Funding scheme:**

	RIA - Research and Innovation action

Objective

Diagnostic tests are essential to provide a targeted treatment of infectious diseases and to contain the further spread of multidrug resistant pathogens. Current methods are based either on cultivation or on PCR and have significant limitations concerning the clinical requirements to characterise pathogens including their resistance mechanisms within 3 hours. In MARA, we will develop and combine three radically novel technologies that will lead to substantial breakthroughs in science, medicine and industry and, as proof-of principle, use them to create a DNA-based molecular toolkit characterising pathogens.

First, the detection of pathogen-associated antigens will be performed by Autonomous Detection Nucleic Acids (AUDENA) that are independent of any laboratory instruments and sophisticated processing. The realisation of the AUDENA concept will lead to an autonomous, stable, simple and very economic novel sensor class applicable for any water-soluble substances. The second revolutionary technology in MARA employs a novel approach in protein mimicry and creation of artificial enzymes, which represents a breakthrough in several disciplines, such as biotechnology, biomedical manufacturing and the energy sector. The third breakthrough in this project represents the development of a Molecular Robot (MORO) that can specifically identify target cells and destroy them. In MARA, the MORO will be used for the lysis of bacterial cells to release intracellular antibiotic resistance associated antigens, but the long-term vision anticipates an application as antibiotic replacement for infectious diseases and a therapeutic agent for cancer treatment, which would represent one of the most important breakthroughs in medicine in the recent years.

To meet the highly ambitious objectives pointed out in this proposal, MARA is driven by a complementary, multidisciplinary team of leading experts, with a young, high-profile scientist in the lead.

Coordinator

AIT Austrian Institute of Technology GmbH

Austria

EU contribution: EUR 1 275 767,5

Donau-City-Strasse 1

1220 WIEN

Austria

Participants

ALBERT-LUDWIGS-UNIVERSITAET FREIBURG

Germany

EU contribution: EUR 581 250

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IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE

United Kingdom

EU contribution: EUR 647 250

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EU contribution: EUR 548 460

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Last updated on 2016-01-13

Retrieved on 2016-02-04

Permalink : http://cordis.europa.eu/project/rcn/199035_en.html

SUPERTWIN

Project reference : 686731
Funded under : H2020-EU.1.2.1.

All Solid-State Super-Twinning Photon Microscope

From 2016-03-01 **to** 2019-02-28, Grant Agreement signed

Project details

Total cost:	**Topic(s):**
EUR 3 939 516,25	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 3 925 921,75	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Italy	**Funding scheme:**
	RIA - Research and Innovation action

Objective

The goal of the project is to develop the technology foundation for an advanced optical microscope imaging at a resolution beyond the Rayleigh limit, which is set by the photon wavelength. The proposed microscope technique is based on super-twinning photon states (N-partite entangled states) with the de Broglie wavelength equal to a fraction of the photon wavelength. Such microscopy technique will comprise building blocks for object illumination, capturing of scattered twinning photons and data processing. Based on advanced group-III nitride and III-V alloy epitaxial growths and wafer processing techniques we will build the first solid-state emitter of highly entangled photon states, utilizing the cooperative effect of Dicke superradiance (super-fluorescence) emission. Single-photon avalanche detector arrays with data pre-processing capabilities sufficient for capturing high-order field correlation functions of scattered twinning photons will be developed. A dedicated data processing algorithm for extracting the image of an illuminated object from the statistics of scattered twinning photons will complement the hardware. The project goal is to demonstrate imaging at 42 nm spatial resolution using 5-partite entangled photons at 420 nm wavelength. This quantum imaging technology will open the way for compact, portable, super-resolution microscope techniques, with no moving parts and no requirements to the optical properties of the sample.

Coordinator

FONDAZIONE BRUNO KESSLER

Italy

EU contribution: EUR 554 750

VIA SANTA CROCE 77

38122 TRENTO

Italy

Participants

A.P.E. RESEARCH SRL

Italy

EU contribution: EUR 297 656

Basovizza SS 14 Km 163,5 Area di Ricerca

34012 TRIESTE

Italy

CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA • RECHERCHE ET DEVELOPPEMENT

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France
EU contribution: EUR 552 046

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Netherlands
EU contribution: EUR 218 750

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UNIVERSITAT BERN

Switzerland
EU contribution: EUR 474 101

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ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE

Switzerland
EU contribution: EUR 468 718,75

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Switzerland
B.I. Stepanov Institute of Physics of the National Academy of Sciences of Belarus

Belarus
EU contribution: EUR 222 500

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Italy
EU contribution: EUR 434 375

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67051 AVEZZANO AQ
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Last updated on 2016-01-20
Retrieved on 2016-02-04
Permalink : http://cordis.europa.eu/project/rcn/199027_en.html

LIAR

Project reference : 686585
Funded under : H2020-EU.1.2.1.

Living Architecture

From 2016-04-01 **to** 2019-03-31, Grant Agreement signed

Project details

Total cost:	**Topic(s):**
EUR 3 216 555	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 3 216 555	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
United Kingdom	**Funding scheme:**
	RIA - Research and Innovation action

Objective

Living Architecture (LIAR) is a modular bioreactor-wall, which is based on the operational principles of microbial fuel cell technology and synthetic 'consortia' of microbes. LIAR is conceived as a next-generation selectively-programmable bioreactor and integral component of human dwelling, capable of extracting valuable resources from waste water and air, generation of oxygen and production of proteins and fiber by manipulating consortia performance. Its operational principles are grounded in distributed sensing, decentralised autonomous information processing, high-degree of fault-tolerance and distributed actuation and reconfiguration. Applications within urban systems are examined as a form of customizable micro-agriculture for installation in domestic, public (schools, hospitals) and office environments. Such a system has far reaching impacts on the building performance (resilience, resource recycling) manufacturing and design with ecosystems.

The project establishes:

• Foundational concepts through which 'designed' metabolisms can computationally process, recycle, remediate and synthesise valuable compounds from waste water.

• Transferable principles by which synthetic ecosystems can shape the environmental performance of our living spaces to increase our health, productivity and ecosystems impact.

• New standards for synthetic 'ecosystems' through consortia design, engineering and optimization.

Coordinator

UNIVERSITY OF NEWCASTLE UPON TYNE

United Kingdom

EU contribution: EUR 340 306,25

KINGS GATE

NE1 7RU NEWCASTLE UPON TYNE

United Kingdom

Participants

UNIVERSITY OF THE WEST OF ENGLAND, BRISTOL

United Kingdom

EU contribution: EUR 897 605

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United Kingdom

AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS

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EU contribution: EUR 975 151,25

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28006 MADRID
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LIQUIFER SYSTEMS GROUP GMBH

Austria
EU contribution: EUR 324 086,25

OBERE DONAUSTRASSE 97-99 1 62
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EXPLORA SRL

Italy
EU contribution: EUR 462 187,5

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Italy
UNIVERSITA DEGLI STUDI DI TRENTO

Italy
EU contribution: EUR 217 218,75

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Last updated on 2015-11-20
Retrieved on 2016-02-04
Permalink : http://cordis.europa.eu/project/rcn/199033_en.html

CellViewer

Project reference : 686637
Funded under : H2020-EU.1.2.1.

CellViewer: super-resolution systems microscopy to assess pluripotency and differentiation of stem cells at single cell level

From 2016-02-01 **to** 2020-01-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 988 752,5	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 3 988 752,5	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Spain	**Funding scheme:**
	RIA - Research and Innovation action

Objective

In this ambitious and multi-disciplinary proposal, we aim to develop new technologies that will allow us to visualize in single cells, in parallel and at the systems level, DNA, mRNAs and proteins with nanoscale resolution. We will refer to these novel technologies as the ‘CellViewer’: a unique cutting-edge high-throughput super-resolution (SR) microscopy approach (including new hardware and software development) to collect at high-resolution a large amount of spatial and dynamic information in single cells. ‘CellViewer’ will allow us to study the mechanisms of mouse embryonic stem cell (mESC) self-renewal and differentiation upon application of specific stimuli, as a specific test case. We will analyse in single cells with high throughput, DNA remodelling at multiple specific gene loci and their corresponding production, distribution and kinetics of mRNA and protein products. We will collect a large amount of dynamic and nanoscale spatial information that will lead us to build predictive models of the phenotypic output from specific input stimuli. In turn, we will be able to develop a mechanistic understanding of how mESCs maintain their stemness or commit to differentiation. The partners of CellViewer are internationally recognized experts from academia and industry in the fields of stem cell and chromatin biology, super-resolution microscopy, quantitative modelling of biological systems, and hardware and software development. This team as a whole is uniquely suited to bring Systems Biology into the era of single cell analysis, which will be a paradigm shift in the way cellular systems will be studied.

Coordinator

FUNDACIO CENTRE DE REGULACIO GENOMICA

Spain

EU contribution: EUR 1 197 315

CARRER DOCTOR AIGUADER 88

08003 BARCELONA

Spain

Participants

FUNDACIO INSTITUT DE CIENCIES FOTONIQUES

Spain

EU contribution: EUR 778 312,5

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08860 Castelldefels

Spain

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Germany

EU contribution: EUR 479 375

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Israel

LABORATORY IMAGING SPOL SRO

Czech Republic

EU contribution: EUR 250 000

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16000 PRAHA

Czech Republic

Idea Bio-Medical Ltd.

Israel

EU contribution: EUR 458 750

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Israel

Last updated on 2015-11-09

Retrieved on 2016-02-04

Permalink : http://cordis.europa.eu/project/rcn/199030_en.html

FutureAgriculture

Project reference : 686330
Funded under : H2020-EU.1.2.1.

Transforming the future of agriculture through synthetic photorespiration

From 2016-01-01 **to** 2020-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 4 871 410	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 4 871 410	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Germany	**Funding scheme:**
	RIA - Research and Innovation action

Objective

For a new green revolution to feed the continually increasing population, agriculture productivity will have to be significantly improved. Photorespiration represents a big challenge in this respect, because it dissipates energy and leads to the futile loss of CO2, thereby limiting plant growth yield. Implementing an efficient metabolic bypass for photorespiration can therefore increase the photosynthetic efficiency of many cultivated crops. Several such routes were previously proposed. However, these routes were limited to existing enzymes and pathways and provided only partial improvement. Here, we propose a radically different approach: to engineer entirely novel CO2-neutral or CO2-positive photorespiration bypasses based on novel enzyme chemistry that support significantly higher agricultural yields. These bypass routes could support 60% higher biomass yield per turn of the Calvin Cycle and >30% higher yield per ATP. Our project innovatively integrates different research disciplines and combines academic research with industrial implementation. In silico studies will integrate biochemical logic and pathway modelling to explore all possible photorespiration pathways and identify the most efficient routes. In vitro research will establish novel enzyme functions via enzyme engineering and directed evolution. Full pathways will be reconstituted and optimized in vitro using a novel mass spectrometry based platform. High in vivo activity will be selected by implementing the pathways in engineered E. coli strains. Enhanced photosynthetic efficiency will be demonstrated in cyanobacteria expressing the synthetic pathways. Finally, the most promising synthetic pathways will be implemented in higher plants and growth phenotypes will be monitored. The proposed project comprises a significant advance in synthetic biology – applying biochemical principles to modify the very core of carbon metabolism with synthetic pathways that carry multiple novel enzymatic functions.

Coordinator

MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.

Germany

EU contribution: EUR 1 934 025

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80539 MUENCHEN

Germany

Participants

IN Srl

Italy

EU contribution: EUR 203 750

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IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE

United Kingdom
EU contribution: EUR 955 215

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WEIZMANN INSTITUTE OF SCIENCE

Israel
EU contribution: EUR 875 887,5

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Israel
EU contribution: EUR 902 532,5

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7612002 REHOVOT
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Last updated on 2016-01-20
Retrieved on 2016-02-04
Permalink : http://cordis.europa.eu/project/rcn/199039_en.html

HORIZON 2020

GOTSolar

Project reference : 687008
Funded under : H2020-EU.1.2.1.

New technological advances for the third generation of Solar cells

From 2016-01-01 **to** 2018-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 2 993 403,75	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 2 993 403,5	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Portugal	**Funding scheme:**
	RIA - Research and Innovation action

Objective

It is believed that solid-state perovskite solar cells (PSCs) will be the next generation of power source, contributing for fostering

the use of photovoltaics in buildings' roofs and facades. Actually, their transparency, various possibilities of colors and high kWh/nominal power ratio offer to PSCs an opportunity to conquer markets that are not attainable by traditional silicon solar cells. To turn this ambition to a marketable product several efforts are still needed and this project aims to give relevant answers to those key challenges.

GOTSolar proposes disruptive approaches for the development of highly efficient, long-lasting and environmentally safe PSCs. Metal oxide scaffolds employing perovskites and pigment materials with extraordinary high-efficient light harvesters in conjunction with solid-state HTMs will be developed and assembled together. The obtained materials will be characterized to elucidate the interplay of the mesostructure, the perovskite absorber and the HTM layer. These measurements will be used to understand the circumstances electron and/or hole collection is favourable allowing the optimization of the whole device. This understanding and the developed materials will provide the tools to push the PV performance towards 24 % efficiency for lab-size (ca. 25 mm2) and stable for 500 h under 80 °C. In parallel, lead-free light absorbers will be developed aiming a power conversion efficiency of 16 %, also in lab-size cells. These high-efficient devices will be encapsulated using a new hermetically laser assisted glass encapsulation process to enable high-durability and tested under accelerated aging conditions. Following, a device of 10 × 10 cm2 will be built and used for demonstrating the scalability of the developments for producing the first perovskite solar module with potential for 20 years of lifetime.

Coordinator

UNIVERSIDADE DO PORTO

Portugal

EU contribution: EUR 670 046

PRACA GOMES TEIXEIRA

4099 002 PORTO

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Portugal

EU contribution: EUR 102 500

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Portugal

DYESOL UK LTD

United Kingdom

EU contribution: EUR 650 000

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INSTYTUT CHEMII FIZYCZNEJ POLSKIEJ AKADEMII NAUK

Poland

EU contribution: EUR 326 450

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CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

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EU contribution: EUR 374 357,5

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EU contribution: EUR 219 925

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MSmed

Project reference : 686547
Funded under : H2020-EU.1.2.1.

Mass spectrometric technology for next generation proteomics in systems medicine

From 2015-12-01 **to** 2019-11-30, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 5 038 875	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 3 672 625	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
Denmark	**Funding scheme:**
	RIA - Research and Innovation action

Objective

Systems medicine designates the application of global approaches to human health and disease. Genomic technologies, especially next-generation sequencing, are already pioneering this new area. There is an urgent need to advance proteomics technologies to a similar level. This will help revolu¬tionize diagnosis and prognosis based on the expression levels and modifications of proteins in cells, tissues, organoids or body fluids. Our vision is to make mass spectrometry so robust and powerful that it will be present in every biological laboratory and in every clinic.

The applicants are leaders in proteomics technologies from academia and industry and have an out-standing track-record in advancing both instrumentation as well as its application in biological and disease contexts. Here we come together to develop breakthrough technology capable of more than a factor ten improvement in parameters of performance of the mass spectrometric workflow, ena¬bling patient-oriented proteome profiling.

The proteomics workflow will be automated, multiplexed and made ‘industrial strength’ • ready for high-throughput and in-depth clinical applications. Importantly, in addition to the identification of the main protein representative of a gene, we aim to routinely identify and quantify protein modifications and isoforms by using multidimensional approaches, including new separation, enrichment and frag¬mentation technologies. The breakthroughs aimed for will generate larger more biologically relevant data. This data will be merged with other ‘omic’ data and mined using machine learning technologies.

Our results will establish the role mass spectrometry in systems medicine, making all workflows and mass spectrometry platforms available to the community. They will be used as the basis of myriad applications in biomedicine, even in the clinic. This in turn will lead to a new eco-system around improved diagnosis, elucidations of disease mechanisms and drug action.

Coordinator

KOBENHAVNS UNIVERSITET

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MAGNEURON

Project reference : 686841
Funded under : H2020-EU.1.2.1.

Hijacking cell signalling pathways with magnetic nanoactuators for remote-controlled stemcell therapies of neurodegenerative disorders

From 2016-01-01 **to** 2019-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 3 473 026	FETOPEN-1-2014 - FET-Open research projects
EU contribution:	
EUR 3 473 026	**Call for proposal:**
Coordinated in:	H2020-FETOPEN-2014-2015-RIA
France	**Funding scheme:**
	RIA - Research and Innovation action

Objective

Neurodegenerative diseases, such as Parkinson’s disease, are a major public health issue given the aging population in Europe and beyond. While curative pharmacological treatment of these diseases is not in sight, cell replacement therapies (CTs) are considered very promising, in particular with the advent of stem-cell reprogramming technologies. However, a fundamental challenge in the medical application of CTs in the brain of patients lies in the lack of control of cell behaviour at the site of transplantation, and particularly their differentiation and oriented growth. The aim of this project is to introduce a fundamentally new concept for remote control of cellular functions by means of magnetic manipulation. The technology is based on magnetic nanoparticles functionalized with proteins involved in cellular signalling cascades. These biofunctionalized MNPs (bMNPs) will be delivered into target cells, where they act as intracellular signalling platforms activatable in a spatially and temporally controlled manner by external magnetic fields. The project will focus on engineering these tools for the control of neuronal cell programming and fibre outgrowth by hijacking Wnt and neurotrophin signalling, respectively, with the ulti-mate objective of advancing cell replacement therapies for PD using dopaminergic precursor neurons.

To achieve this ambitious goal, we have gathered an interdisciplinary consortium interfacing scientists having cutting-edge know-how in bMNP engineering, surface functionalization and cellular nanobiophysics with renowned experts in neuronal cell differentiation, stem-cell reprogramming and regenerative (nano-)medicine. By exploiting this complementary expertise, a novel, versatile technology for magnetic control of intracellular signalling is envis-aged, which will be a breakthrough for remote actuation of cellular functions and its successful implementation in CTs for neurodegenerative diseases and injuries within the following decade.

Coordinator

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