



Annex

MSCA IF 2018 call for proposals:

Examples of projects selected for funding

Fighting paediatric cancer

Spaniards have their daily siesta, Germans like sausages and Belgians love beer. Stereotypes can certainly be misleading, just like judging a cell by its membership to a particular cell type, the so-called population-based analysis. Nowadays we know that tumors are tremendously heterogeneous and, in the era of single-cell sequencing, we have the exquisite opportunity to study each individual cell with unprecedented resolution. Acute lymphoblastic leukaemia (ALL), which is the most common cancer in children, shows extensive genetic intratumoral heterogeneity. This heterogeneity might be the underlying reason for an incomplete response to treatment and for the development of relapse. In order to envision its clinical implementation, it is essential to first i) generate a single-cell map and ii) accumulate evidence on how the subclonal composition affects the response to treatment.

The results of scTALLmap will have significant impact in leukaemia by paving the way for improved risk stratification based on the cellular heterogeneity and the presence of high-risk subclones at diagnosis. Ultimately, it will permit the design of novel and more personalized therapeutic modalities sparing toxicity and targeting the full complement of leukaemia subclones.

Project scTALLmap:

Single-cell map of the composition and evolution of T-cell acute lymphoblastic leukaemia

Coordinator: VIB

EU funding: EUR 178.320

Confronting plastic waste pollution

Since the 1970s, the mismanagement of plastic waste has been increasingly threatening our health and environment. By 2050, the estimation of plastic waste in landfills or in the natural environment verges on 12 billion metric tons, if current production and waste management trends continue. Societies are raising awareness about this concern, although our dependency makes nearly impossible to imagine a world without plastics. This urges for a solution making plastic production and degradation sustainable.

Although there is empirical evidence of it, the rates of biodegradation are still very low. The SOLFORPLAS project will apply cutting-edge biology tools, including fermentation and analytical processes, together with state-of-the-art methods in industrial microbiology research, to investigate plastic biodegradation. The innovative combined strategy will integrate physical, chemical and biological treatment, which will mimic the whole biodegradation process in worms. Overall, SOLFORPLAS project aim at establishing a combined strategy to carry out plastic biodegradation as a solution for plastic pollution, one of the biggest environmental that humans are facing in this century.

Project SOLFORPLAS: A solution for plastic waste pollution

Coordinator: INSTITUT NATIONAL DES SCIENCES APPLIQUEES DE TOULOUSE

EU funding: EUR 184.707,84

Developing sustainable food systems

The European food systems are unsustainable, within a Europe confronting increased environmental degradation, diet related diseases and inequality. Healthcare systems have the capacity to influence the current status quo of food systems towards sustainable means. The objective of the present proposal is to explore the food system processes related with the economic and educative channels of the European health services from a sustainable dimension and to develop the first System of Indicators that will aid up in the decision making of those processes.

The knowledge obtained in this project will be used to develop strategies to target more efficiently the sustainable goals of the United Nations 2030 agenda in Europe. The fellow will be up-skilled (in new research skills and techniques) to advance in the development of a career path towards sustainable science, to translate her background knowledge into a continuing research environment and to build and maintain links with other researchers in sustainable food policy throughout Europe aiming to contribute to policy making and developmental strategies towards sustainable societies.

Project: RENASCENCE: The role of European National Health Services in the enhancement of sustainable food systems

Coordinator: UNIVERSIDAD DEL PAIS VASCO/ EUSKAL HERRIKO UNIBERTSITATEA

EU funding: EUR 241.398,72

Making agricultural systems more resilient to climate change

Objectives of the current and future European CAP are to enhance the climate change resilience of European agriculture, increase climate change adaptation and protect biodiversity. The project Climate change Resilience of Agriculture System (CRAS) aims, through an econometric and computational analysis, to better understand the contribution of agrobiodiversity to the resilience of agroecosystems and to the mitigation of the impacts of climate change on the agricultural sector. Objectives of the project are:

In addition to policy advice, the project will contribute at exposing the debate on biodiversity conservation and climate change through an array of dissemination and communication efforts.

By including versatile training-through-research, multiple dissemination and communication methods, public engagement and networking the project has a strong impact on the researcher's career, on the future research collaboration as well as on the public interest.

Project CRAS: Climate change and Resilience of Agricultural System: an econometric and computational analysis

Coordinator: FONDAZIONE CENTRO EURO-MEDITERRANEOSUI CAMBIAMENTI CLIMATICI

EU funding: EUR 180.369,60

Ensuring Europe's leadership in quantum technologies

Europe's leadership in quantum technologies can only be sustained by fundamental research. A challenge in this field is to choose the physical platform for qubits, the units of a quantum computer. Semiconductor nanowires coupled to superconductors offer a potential solution as a platform for a new type of qubit, which has the unique advantage of being inherently protected from decoherence.

The physical ingredients of this qubit are Majorana modes. A common device geometry used to investigate transport through these modes is a superconducting island coupled to a nanowire. However, at this stage little is known about the interactions of islands with quantum dots, which are themselves commonplace near charge depletion. If this gap in the knowledge is filled, we could learn to distinguish between subgap states related to screening of the dot, and those involving the island/nanowire hybrid. Crucially, only the latter ones are related to Majorana modes.

The researcher will tackle three more fundamental questions: 1) How does a single quasiparticle in the island screen a spin? 2) How does screening occur when the island cannot accept quasiparticles? 3) Can novel non-Fermi liquid physics emerge when adding a superconducting lead to the dot-island system?

Project SpinScreen: Screening of an electron spin by an epitaxial superconducting island in a semiconductor nanowire

Coordinator: KOBENHAVNS UNIVERSITET

EU funding: EUR 207.312,00

Advancing Artificial Intelligence

Artificial Neural Networks (ANNs) form the main approach in Artificial Intelligence (AI). They have two major drawbacks, however: (1) ANNs require significant computational resources; (2) they lack transparency. These challenges restrict the widespread application of AI in daily life.

The overall research aim of this action is to improve the understanding of computing principles in high-dimensional spaces with VSAs, and to advance the theory and design principles of simple AI algorithms implementable on emerging low-power computing hardware. The research aim comprises five research objectives. These are relevant to H2020 Work Programme since this action has much potential with respect to the "market creating innovation" and "digitising and transforming industry" aspects of the Programme. The mechanisms for achieving the objectives include both theoretical development and applied investigations. The methodological approach combines the current skills of the applicant with those acquired during this action. The applicant will develop VSAs skills to qualitatively higher level while working under the supervision of eminent researchers. This will enhance applicant's professional maturity and prepare him for an independent career.

Project devSAFARI: A Low-Power Artificial Intelligence Framework based on Vector Symbolic Architectures

Coordinator: RISE SICS AB/Partner organisation: University of California, Berkeley. Helen Wills Neuroscience Institute

EU funding: EUR 279.192,00

Eliminating toxic ingredients in medication and cosmetics

The main goal of the proposed research project is the computational evaluation of eco-toxicity (of various chemicals that are vastly utilized and produced by the pharmaceutical and cosmetic industries

The research will be majorly focusing on toxicity in aquatic environment. The toxicity related properties that will be studied include acute and chronic toxicity, biodegradation and bioaccumulation. The research methodology to perform toxicity assessment and for understanding the structural features responsible for the eco-toxicity, will involve diverse Artificial Intelligence (AI) and chemoinformatics techniques.

The knowledge gained from the study will help in classifying existing chemicals into toxic and non-toxic groups and will also help in designing novel analogues of selected chemical that will show better desirable physicochemical properties with less or no eco-toxicity. This project will include the development of AI software tools and scheming KNIME workflows for various computational tasks.

Project Eco-CosmePharm: Computational 'eco-toxicity' assessment of pharmaceutical and cosmetics materials, an approach towards a green and sustainable environment

Coordinator: PROTOQSAR 2000 SL

EU funding: EUR 172.932,48

Muslim women and biographical cinema

This pioneering interdisciplinary project identifies a new object of study, Muslim women's auto/biographical filmmaking, and studies the contextual factors that distinguish it within the field of women's and feminist cinema. Muslim women academic writers, historians, critics and journalists have been instrumental in establishing a distinctly Muslim feminist identity. They have also turned to the film medium to extend their feminist intent and representations from their particular socio-historical and contextual perspectives. However, research on Muslim women's contribution to feminist auto/biographical cinema remains a gaping lacuna in film studies.

This project aims to fill this gap. Its objectives are: a) To create a corpus by identifying and categorizing the different modes of autobiographical films produced by Muslim women filmmakers from the Islamic world from the 1980s to date. b) To develop a contextual scholarly study on works of representative directors to examine Muslim women's auto/biographical contribution to feminist cinema in the context of their political, personal, historical, social, and institutional conditions.

Project MUSLIMWOMENFILM: Locating the Storyteller: Muslim Women's Auto/Biographical Cinema from the Islamic World

Coordinator: UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK

EU funding: EUR 196.590,72