

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	1
JRC Directorate	C: Energy, transport, and climate
Unit	C.3: Energy security, distribution, and markets
Location	Petten
Short description of the activities of the Unit	The mission of the JRC’s Energy Security, Distribution and Markets Unit (C.3) is to aid and inform the European Institutions, Member States and relevant stakeholders on issues relevant to ensuring the proper design and functioning of the energy markets and the digitalization of energy systems, and the uninterrupted physical availability of energy products and services at an affordable price for all consumers. C.03 assesses how different policy options help shape an energy system resilient to shocks, disturbances, and adverse trends, whilst satisfying European society’s energy needs.
Title of the JRC proposed Activity:	Science diplomacy in energy research
Short description of the proposed activity:	<p>Science diplomacy is considered as an important 'soft power', i.e. the ability of a country to persuade others to do what it wants without force or coercion. In the context of the European Commission, science and energy diplomacy can be integrated for achieving the EU's global targets, especially in the domains of energy market coupling, climate objectives etc.</p> <p>The European Union External Action Service (EEAS) is interested in developing activities ON Science Diplomacy (https://eeas.europa.eu/topics/science-diplomacy_en) and recently expressed interest for collaborating with JRC Directorate C for establishing actions on science diplomacy (meeting between Director of JRC Dir. C and HoU of EEAS Global 2 of 20 March 2018).</p> <p>The proposed activity will be based on the transfer of know-how on developing and exercising science diplomacy. A practical application will also be developed, e.g. with the Chinese Academy of Sciences.</p>
Required profile of the Partner Institution:	University or Research Institution with a sound experience and expertise in leading programmes that include lectures, workshops, courses and prizes to build a bridge between the worlds of science and diplomacy.
Indicative required profile of the researcher/expert (that will implement the activity)	The researcher must have experience in brokering joint scientific activities across nations, preferably between EU and extra-EU countries, in the area of energy (infrastructure, economics, evaluation, etc.).

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Reference no.:	2
JRC Directorate	C3
Unit	Energy Security, Distribution and Markets
Location	Smart Grid Interoperability Laboratory (SGIL), Petten, NL
Short description of the activities of the Unit	<p>The mission of the JRC’s Energy Security, Distribution and Markets Unit (C.3) is to aid and inform the European Institutions, Member States and relevant stakeholders on issues relevant to ensuring the proper design and functioning of the energy markets and the digitalization of energy systems, and the uninterrupted physical availability of energy products and services at an affordable price for all consumers. C3 assesses how different policy options help shape an energy system resilient to shocks, disturbances, and adverse trends, whilst satisfying European society’s energy needs.</p> <p>A modern energy infrastructure is crucial for an integrated energy market and to enable the EU to meet its broader climate and energy goals. Europe must modernise and expand its energy network to absorb energy from renewable sources and secure supplies everywhere. This requires considerable investment in the existing gas and electricity networks, with rapid development of their interconnections. Indeed, security of supply, competitiveness or sustainability goals will never be met without resilient, reliable and smart energy networks.</p> <p>The JRC aims to provide a solid and comprehensive understanding of energy security in support of EU policy, notably in relation to fossil fuels (mainly gas and oil) and power systems. The aim of the JRC’s Energy Security, Distribution and Markets Unit is to aid and inform the Member States and European Institutions on issues relevant to ensuring the uninterrupted physical availability of energy products on the market at an affordable price for all consumers. The JRC assesses how different policy options help shape an energy system resilient to shocks and adverse trends whilst satisfying society’s energy needs.</p>
Title of the JRC proposed Activity:	Real time simulation (RTS) setup in the context of the co-simulation platform or ERIC-LAB
Short description of the proposed activity:	Real time simulation is reproducing the behaviour of a physical system through running its computer-based model at the same rate as actual wall clock time. In other words, in real time simulation, when the simulation clock reaches a certain time, the

	<p>same amount of time has passed in the real world. For example, if a process takes 1 second to finish in the real world, the simulation would take 1 second as well. Real time simulation is typically used for high-speed simulations, closed-loop testing of protection and control equipment, and generally all “What-if” analyses. Real time simulation is actually simulating a system, which could realistically respond to its environment, when the inputs/outputs of the simulation are synchronous with the real world.</p> <p>--</p> <p>The activity will take place in the Smart Grid Interoperability Laboratory and it will include:</p> <ul style="list-style-type: none"> • setting up the Opal-RT real time simulator; • setting up the a Triphase amplifier; • connection the RTS to the amplifier; • setting up a remote connection with the ERIC-LAB partners (http://www.eric-lab.eu); • performing modelling and simulation activities in the developed platform with possible inclusion of hardware in the loop (HIL);
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution with sound knowledge and expertise in the fields of engineering, in particular electrical, industrial, automation, control.</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Engineering: electrical, industrial, automation, control. The project requires both hardware and software skills.</p>

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Reference no.:	3
JRC Directorate	D - Sustainable Resources
Unit	D2 -Water and Marine Resources
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>Unit D2 mission is to carry out scientific assessments addressing societal and economic challenges deriving from the evolving vulnerability of the European and global water environment. It contributes innovative solutions to sustainably manage water resources in the face of increasing trends of global population, urbanisation, pollution, over-exploitation, land use and climate change and ensures that they are adequately linked to policy development and implementation.</p> <p>Within the Unit, activities linked to the climate change and water, are focused on emerging bacterial and viral disease among them the mosquitoes' migration in Europe carrying viral diseases.</p>
Title of the JRC proposed Activity:	Development of methods to detect mosquitoes carrying viruses
Short description of the proposed activity:	<p>Mosquitoes and ticks are responsible for the transmission of several pathogenic viruses to humans. Recently, due to global temperature changes and increased movement of people, two phenomena have been observed i) the migration of the mosquitoes to places which have become warmer, enabling the adaptation of vectors to new niches and the spread to new areas and ii) the ability to better survive during winter. Indeed, the increasing incidence of warm winters favours better conditions for the life of mosquitoes and ticks, as well as their reservoir animals, increasing the risk of exposure of humans to virus infection especially in urban areas. The most recent examples, such as the West-Nile, Chikungunya and Zika incursions in the Americas, the expansion of West Nile and Tick-Borne Encephalitis in Europe and the epidemic foci of Chikungunya of 2008 and 2017 in Italy, reflect changes in the ecology, epidemiology and behaviour of pathogens that had been present for decades at low levels in remote areas of the world. Therefore, there is an urgent need to concert the efforts covering the basic and clinical research with interdisciplinary approaches for vector monitoring and control, climatology, management of large set of data for surveillance and prediction of outbreaks.</p> <p>The activity will be focused on two main objectives</p>

	<ol style="list-style-type: none"> 1. Application of molecular based techniques for the detection of viruses in eggs and larvae of mosquitoes to monitor their presence in selected areas, possible in collaboration with regional agencies. 2. Development of a molecular based method for the detection for viruses pointing to multi-parametric tests in point-of-care format to be deployed in the field.
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution with a dedicated laboratory in Molecular Virology to study of arthropod-borne viral diseases including Dengue, Zika, Chikungunya and tick-borne encephalitis. Particularly relevant is the expertise in development of point-of-care devices for the surveillance of arboviruses both in humans and animals, as well molecular tests and serological assays to be deployed directly in the field for a quick and tailored response to emerging and re-emerging infections</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Degree in life sciences PhD degree in virology or related disciplines, experience in molecular and cellular biology would be an asset.</p>

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Reference no.:	4
JRC Directorate	D - Sustainable Resources
Unit	D2 -Water and Marine Resources
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>Unit D2 mission is to carry out scientific assessments addressing societal and economic challenges deriving from the evolving vulnerability of the European and global water environment. It contributes innovative solutions to sustainably manage water resources in the face of increasing trends of global population, urbanisation, pollution, over-exploitation, land use and climate change and ensures that they are adequately linked to policy development and implementation.</p> <p>Within the Unit activities linked to threats to biodiversity are focused on alien species.</p>
Title of the JRC proposed Activity:	European Alien Species Information Network - EASIN
Short description of the proposed activity:	<p>Europe is severely affected by biological invasions, which impact biodiversity, ecosystem services, economy and human health. Sufficient high quality information on alien species ecology, distribution, pathways of introduction, impacts, and effective management strategies is a prerequisite for the efficient prevention, early detection, rapid response, management of biological invasions. With this aim, EASIN (European Alien Species Information Network; https://easin.jrc.ec.europa.eu/) has been developed by the European Commission's JRC, and formally recognized as the information system supporting European Member States in the implementation of the IAS Regulation 1143/2014. EASIN plays an important role facilitating access to updated scientific information on alien and invasive alien species occurring in Europe's terrestrial, freshwater and marine environments, enabling analysis of data through data exploration services and mapping tools.</p> <p>The activity proposed includes the involvement in the context of EASIN in one of the following research topics:</p> <ul style="list-style-type: none"> - citizen science and invasive alien species, including activities such as data evaluation, data visualization, citizen engagement, etc; - the assessment of terrestrial alien fauna species, including

	<p>the analysis of origins, pathways and gateways;</p> <ul style="list-style-type: none"> - the assessment of the impact of selected species on ecosystems services and/or socioeconomic activities.
Required profile of the Partner Institution:	<p>University or Research Institution with sound knowledge and expertise in the fields of biology, ecology and environmental sciences, with research activities in areas such as:</p> <ul style="list-style-type: none"> - biodiversity, conservation and ecosystem management - environmental biology - environmental economics - environmental citizen science
Indicative required profile of the researcher/expert (that will implement the activity)	<p>Degree in life sciences</p>

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Reference no.:	5
JRC Directorate	D-Sustainable Resources
Unit	D2 -Water and Marine Resources
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>Unit D2 mission is to carry out scientific assessments addressing societal and economic challenges deriving from the evolving vulnerability of the European and global water environment. It contributes innovative solutions to sustainably manage water resources in the face of increasing trends of global population, urbanisation, pollution, over-exploitation, land use and climate change and ensures that they are adequately linked to policy development and implementation.</p> <p>Within the Unit a dedicated group is focused on the application of metagenomics to investigate role of microbial communities in water and related policies.</p>
Title of the JRC proposed Activity:	Microbiome and its role in the environment
Short description of the proposed activity:	<p>In the last years, research in microbiology showed that microorganisms most commonly live as part of complex multispecies communities. Microbial communities very often coordinate their behaviour in order to synchronize their activities ensuring a communal benefit in their gene expression and production of secondary metabolites and/or secretion of proteins. Moreover, a microbial community is much more resistant to biotic and abiotic stresses since it is organized as biofilms which are resistant to antimicrobials and monopolizes the nutrients of the niche. Microbial community studies have important implications in the next generation agriculture, water quality and in the treatment human disease. The activity will be focused on the following objectives and as pilot case it will be a plant fungal disease:</p> <ol style="list-style-type: none"> 1. Study of microbiomes; composition, formation and role of microbiomes in a specific environment identifying and characterizing signaling molecules and understanding their roles in microbial communities. 2. Role of pathobiomes in diseases; characterizing the microbiome in infections/diseases in order to establish partners and microbial community dynamics of disease in the environment

<p>Required profile of the Partner Institution:</p>	<p>Expertise in microbiology particularly in bacterial multispecies communities, signalling and pathways in emerging plant pathogenic and beneficial bacteria. The eligible institution will have availability of technical skills in the characterization, diagnosis and taxonomy of bacterial plant pathogens, and in molecular and bioinformatic techniques for nucleic acid analysis such as genomics, ribosomal RNA/DNA analysis, community characterization using next generation sequencing based approaches</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Degree in life sciences PhD and experience in molecular biology techniques and in metagenomics would be an asset</p>

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Reference no.:	6
JRC Directorate	Directorate D – Sustainable Resources
Unit	D2 – Water and Marine Resources
Location	JRC, Ispra, (Italy)
Short description of the activities of the Unit	Unit D2 provides scientific and technical support to Commission services. In particular, its mission is to carry out scientific assessments addressing societal and economic challenges deriving from the evolving vulnerability of the European and global water environment. It contributes innovative solutions to sustainably manage water resources in the face of increasing trends of global population, urbanisation, pollution, over-exploitation, land use and climate change, ensuring that they are adequately linked to policy development and implementation.
Title of the JRC proposed Activity:	Improvement of JRC’s marine modelling framework in the Adriatic/Mediterranean Sea regions
Short description of the proposed activity:	<p>The marine modelling team of unit D02 has been developing a Marine Modelling Framework (MF) during the last years in order to create simulation tools that allow the exploration of scenarios on ecosystem status and function of different EU basins. The main aim of the MF is to support policies at EU level that deal with the status of marine ecosystems and with the goods and services they provide to society. Scenario generation for policy evaluations (such as the Marine Strategy Framework Directive) is the major objective of the MF at large.</p> <p>The Mediterranean Sea MF implementation is currently the most advanced of all regional seas as it is able to provide realistic representation of past, present and future hydrodynamic and biogeochemical conditions in the basin. However, work is still needed in order to improve model simulation in certain (mostly coastal) areas. One of these areas is the Adriatic Sea that is, at the same time, one of the most productive and biologically rich zones of the Mediterranean. One limitation of the current MF is, that in spite of several attempts to improve models setups (<i>e.g.</i>, changing external forcings, rivers’ conditions, etc..), it is not capable to fully simulate the complex spatial production patterns in the Adriatic region as depicted by remote sensing information. Henceforth, the activity with a researcher experienced with biogeochemical and/or ecosystem modelling in the region could be highly valuable to better calibrate and setup the MF for this</p>

	<p>particular and very relevant Mediterranean Sea sub-basin. Transfer of information on model setups, appropriate scale of the external forcings and on the land-ocean connections in the region would largely benefit the receiving team (JRC).</p> <p>At the same time, the selected researcher will get exposure to the JRC science-policy linking work, thus learning how to better use scientific research tools that directly support policy makers and stakeholders in general.</p>
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution with sound experience and research groups working on Adriatic Sea/Mediterranean modelling.</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>The ideal candidate should be an expert in hydrodynamic-biogeochemistry and/or ecosystem modelling of the Adriatic/Mediterranean Sea. Experience with model development, setup, calibration and validation would be much appreciated. Ideally the selected researcher should be familiar with the specific models already being used at JRC (GETM, ERGOM, FABM, EwE), although this is not compulsory.</p>

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Reference no.:	7
JRC Directorate	D-Sustainable Resources
Unit	D2 -Water and Marine Resources
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	Unit D2 mission is to carry out scientific assessments addressing societal and economic challenges deriving from the evolving vulnerability of the European and global water environment. It contributes innovative solutions to sustainably manage water resources in the face of increasing trends of global population, urbanisation, pollution, over-exploitation, land use and climate change and ensures that they are adequately linked to policy development and implementation.
Title of the JRC proposed Activity:	Water scarcity and microbial community modulation: plant pathogenicity as pilot case
Short description of the proposed activity:	<p>Climate change consequences are associated from one side to macro events such as storm waters, droughts, water scarcity and floods and on the other side, to the micro-events such as increase frequency of algal blooms, survival rate increase of microorganisms and (re)-emerging of pathogens. For the latter two phenomena, little is known on how the pathogens take advantage in extreme conditions such as water stress neither which are the favorable parameters.</p> <p>To this aim, the activity proposed is focused on a fungal plant disease, the <i>Fusarium</i> head blight (FHB), one of major worldwide threat for cereal agriculture, to investigate i) the microbial community modulation in water stress condition ii) the microbial community associated to the fungal pathogen iii) the microbial communities promoting or antagonizing the pathogen development.</p> <p>The activity will be focused on three main objectives:</p> <ol style="list-style-type: none"> 1. Identify microbial communities that provide an unfavorable environment for the growth of <i>Fusarium graminearum</i> and <i>Fusarium culmorum</i>, the most relevant causes of FBH. 2. Identify microbial strains or consortia with antagonistic activity against <i>Fusarium graminearum</i> and <i>Fusarium culmorum</i>,

	<p>3. Identify growth promoting microorganisms that reduce plant susceptibility by mitigating water stress, a major conducive condition to FBH.</p>
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution with expertise and activity on the topics of the project, i.e. plant pathology, soil microbiology and metagenomics. The eligible institution will have availability of technical skills in the characterization, diagnosis and taxonomy of fungal and bacterial plant pathogens, and in molecular and bioinformatic techniques for nucleic acid analysis such as genomics, ribosomal RNA/DNA analysis, community characterization using next generation sequencing based approaches.</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Degree in life sciences PhD degree in Microbiology, Plant Pathology or related disciplines and a documented research activity related to the analysis of data with next generation sequencing applied to environmental studies would be an asset.</p>

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Reference no.:	8
JRC Directorate	JRC E - Space, Security and Migration
Unit	JRC E2 Technology Innovation in Security
Location	JRC, Ispra (VA), Italy
Short description of the activities of the Unit	The mission of the Technology Innovation in Security Unit is to increase European competitiveness and resilience by research in technologies, standardisation and harmonisation to enhance the protection of European networked infrastructures and to prevent hazards in industrial installations. The Unit started in 2017 the consolidation of an emerging JRC community of practice around the new Virtual Reality Laboratory (VRLab) jointly with the Knowledge for Thematic Coordination Unit. The VRLab is currently exploring the use of Mixed Reality (Virtual and Augmented Reality) in support of research and science communication and would extend its expertise in support to learning and training tools for safety and security inspectors/officers.
Title of the JRC proposed Activity:	Mixed Reality platform for learning and training purpose in safety and security domain
Short description of the proposed activity:	The proposed activity will aim to develop an innovative mixed reality platform using of-the-shelf devices to enhance the learning and training experience of safety and security inspectors or officers exposed to hazards, in particular ionizing hazard. Application to the decommissioning of obsolete installation could be explored too.
Required profile of the Partner Institution:	University or Research Institution with experience in research in interaction between human and computer and more precisely in emerging information technology such as virtual and augmented reality.
Indicative required profile of the researcher/expert (that will implement the activity)	IT specialist with proven programming experience in mixed reality technology. Experience in application of this technology in the safety and security domain would be an asset.

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Reference no.:	9
JRC Directorate	E – Space, Security & Migration
Unit	E2 – Technology Innovation in Security
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>The mission of the Technology Innovation in Security Unit E.2 is to increase European competitiveness and resilience by research in technologies, standardisation and harmonisation to enhance the protection of European networked infrastructures and to prevent hazards in industrial installations. Special emphasis to be given to the protection of large scale European infrastructures, including the smart grid, the internet, mobile telecommunications networks and the European space assets.</p> <p>Quantum technologies work within the unit is detailed at https://ec.europa.eu/jrc/en/research-topic/quantum-technologies</p>
Title of the JRC proposed Activity:	Evaluation of publicly quantum computing resources
Short description of the proposed activity:	<p>Several large IT companies, including IBM, Microsoft, ATOS, and D-wave are now offering quantum computers, simulators and quantum computing software systems, which allow users to explore the technology. Many simulators are also available from research groups. The scope of the project is to survey what exists, set up accounts, try-out systems and evaluate them. The researcher will be required to conduct their work with an emphasis on applications of interest to the Commission, for which they will be expected to liaise with JRC staff and, where appropriate, colleagues from other Directorates-General.</p>
Required profile of the Partner Institution:	University or Research Institution with sound expertise in physical sciences or information technology.
Indicative required profile of the researcher/expert (that will implement the activity)	The researcher/expert should be a physicist, theoretical chemist, theoretically-orientated engineer, computer scientist or mathematician with knowledge of quantum science, ideally quantum information science.

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Reference no.:	10
JRC Directorate	E – Space, Security & Migration
Unit	E.4 – Safety and Security of Buildings
Location	JRC, Ispra, Italy
Short description of the activities of the Unit	Unit E.4 – Safety and Security of Buildings performs research related to the security, safety and efficiency of buildings and physical infrastructures and their critical elements to create harmonized guidelines for better safety, security and competitiveness on European level. The Unit conducts pre-normative research towards related European standards for safety and security, addressing sustainability and efficiency issues in close collaboration with European Standardisation Organisations and policy makers.
Title of the JRC proposed Activity:	Experimental research on advanced servo-hydraulic control systems
Short description of the proposed activity:	<p>The European Laboratory for Structural Assessment (ELSA) has been operating for decades in the field of advanced seismic testing of full-scale buildings, in particular, using the hybrid testing methodology (a.k.a pseudo-dynamics). Especially for this kind of tests, the containment of the control error has proved to have a major effect in the quality and reliability of results.</p> <p>In the framework of forthcoming research activities, the Unit will accept one application from a scientist interested in participating in developing advanced strategies to improve the mechanical control of large-size servo-hydraulic actuators in terms of control error at intermediate speed (typically 10 mm/s using 100 tons actuators with hydro-dynamic bearings).</p> <p>The work will involve one or more of the following activities:</p> <ul style="list-style-type: none"> • Participate in the development and implementation of experimental campaigns as part of a multidisciplinary team. • Developing/improving new control strategies using simulation software (such as Simulink) and practical testing of developed solution. • Writing technical reports and scientific papers in collaboration with the team.
Required profile of the Partner Institution:	University or Research Institution with sound expertise in the field of civil/structural/mechanical/control engineering, with research activities in areas such as:

	<ul style="list-style-type: none"> - Servo-hydraulic control systems - Advanced experimental techniques for mechanical testing
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Experience/Qualifications:</p> <ul style="list-style-type: none"> - University degree in civil/structural/mechanical/control engineering, or related fields. - Experience in using software for simulating and analysing dynamic systems (such as Simulink) to develop and assess new control algorithms. - A PhD in civil/structural/mechanical/control engineering or other related fields would be an asset.

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Reference no.:	11
JRC Directorate	E – Space, Security & Migration
Unit	E.4 – Safety and Security of Buildings
Location	JRC, Ispra, Italy
Short description of the activities of the Unit	Unit JRC.E.4 – Safety and Security of Buildings performs research related to the security, safety and efficiency of buildings and physical infrastructures and their critical elements to create harmonized guidelines for better safety, security and competitiveness on European level. The Unit conducts pre-normative research towards related European standards for safety and security, addressing sustainability and efficiency issues in close collaboration with European Standardisation Organisations and policy makers.
Title of the JRC proposed Activity:	Advanced experimental research on full-size building specimens
Short description of the proposed activity:	<p>The European Laboratory for Structural Assessment (ELSA) has been operating for decades in the field of advanced seismic testing of full-scale buildings, in particular, using the hybrid testing methodology (a.k.a pseudo-dynamics).</p> <p>In the framework of forthcoming research activities, ELSA would accept one application from a scientist interested in participating in these activities, in particular for testing full-scale buildings with either reinforced concrete or steel structures.</p> <p>The work will involve one or more of the following activities:</p> <p>Participate in the development and implementation of experimental campaigns as part of a multidisciplinary team.</p> <p>Preliminary analysis, monitoring and evaluation of experimental results, also using specific software and database interfacing.</p> <p>Writing technical reports and scientific papers in collaboration with the team.</p>
Required profile of the Partner Institution:	<p>University or Research Institution with sound expertise in the field of civil/structural/mechanical engineering with research activities in areas such as:</p> <ul style="list-style-type: none"> - Structural assessment and retrofitting of existing buildings - Advanced experimental techniques for structural assessment

Indicative required profile of the researcher/expert (that will implement the activity)	Experience/Qualifications: <ul style="list-style-type: none">- University degree in civil/structural/mechanical/electronic/instrument engineering, earthquake engineering or related fields.- A PhD in civil/structural/mechanical/electronic/instrument engineering or other related fields would be an asset.
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Reference no.:	12
JRC Directorate	E – Space, Security & Migration
Unit	E.4 – Safety and Security of Buildings
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	Unit JRC.E.4 – Safety and Security of Buildings performs research related to the security, safety and efficiency of buildings and physical infrastructures and their critical elements to create harmonized guidelines for better safety, security and competitiveness on European level. The Unit conducts pre-normative research towards related European standards for safety and security, addressing sustainability and efficiency issues in close collaboration with European Standardisation Organisations and policy makers.
Title of the JRC proposed Activity:	Seismic design and strengthening of precast concrete building, with emphasis on connections of non-structural elements and dissipation
Short description of the proposed activity:	<p>Most existing industrial, commercial and public buildings are precast concrete structures, and many of them have been designed according to old seismic codes. There is a lot of research assessing the behaviour of precast structures during past earthquakes, for instance the 1976 Friuli Earthquake, Northridge Earthquake 1994, L’Aquila 2009, Grenada 2010 and Emilia 2012.</p> <p>Recent evidence suggests that the behaviour of the structural connections of precast frame structures is satisfactory if they are adequately designed. However, the non-structural component connections, in particular for the heavy cladding elements, remain problematic and further research into their proper design is necessary.</p> <p>The activity consists of:</p> <p>(a) assisting, by means of the necessary numerical simulations, the interpretation of the results of a complex series of tests performed on precast concrete structures focusing, in particular, on non-structural elements like claddings;</p> <p>(b) studying the influence of different types of possible dissipative systems for the seismic rehabilitation of existing underperforming buildings on their structural behaviour.</p>

	The researcher will be acquainted with the experimental techniques which have been used at ELSA for obtaining the experimental data used in the activity. These techniques may be useful in the future career of the fellow.
Required profile of the Partner Institution:	University or scientific institutions with a department of building and/or civil/structural engineering
Indicative required profile of the researcher/expert (that will implement the activity)	<p>Experience/Qualifications:</p> <ul style="list-style-type: none"> - The ideal candidate should have a University degree in Civil or Structural Engineering or Building Engineering. - A PhD in civil/structural engineering or other related fields would be an asset. - The candidate should possess a sufficient mastery of numerical techniques for nonlinear dynamics. Courses on earthquake engineering, design of structures and numerical methods should be demonstrated.

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Reference no.:	13
JRC Directorate	E - Space, Security & Migration
Unit	E.4 - Safety and Security of Buildings
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	Unit JRC.E.4 – Safety and Security of Buildings performs research related to the security, safety and efficiency of buildings and physical infrastructures and their critical elements to create harmonized guidelines for better safety, security and competitiveness on European level. The Unit conducts pre-normative research towards related European standards for safety and security, addressing sustainability and efficiency issues in close collaboration with European Standardisation Organisations and policy makers.
Title of the JRC proposed Activity:	A territorial based integrated economic evaluation of buildings: an application of the Sustainable Structural Design methodology
Short description of the proposed activity:	<p>The definition of a synthetic indicator for characterizing the building stock considering safety and sustainability is the main objective of the SAFESUST project conducted in the Safety and Security of Buildings Unit. The method might assist decision makers in comparing different alternatives and in defining priorities for jointly improving seismic safety and energy efficiency of building stocks at territorial level.</p> <p>The researcher will get acquainted with the developed method and try to apply it at urban and/or local and/or regional scale exploiting the inventory and databases existing for the Region Friuli Venezia Giulia (FVG).</p> <p>Moreover, in order to update the traditional economic estimation methods including safety and sustainability criteria, the researcher should improve the financial-economic framework considering other different variables such as return on investment, expected current value, related financial risks and other related parameters.</p>
Required profile of the Partner Institution:	Universities or Research Institution with a department of Economics and/or Statistics

Required profile of the researcher/expert (that will implement the activity)	Experience/Qualifications: <ul style="list-style-type: none">- The ideal candidate should have a University degree in Economics or Statistics.- A PhD in a related field would be an advantage.- The candidate should possess sufficient experience in statistical data processing.
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Reference no.:	14
JRC Directorate	E- Space, Security & Migration
Unit	E.4- Safety and Security of Buildings
Location	Ispra, Italy
Short description of the activities of the Unit	Unit JRC.E.4 – Safety and Security of Buildings performs research related to the security, safety and efficiency of buildings and physical infrastructures and their critical elements to create harmonized guidelines for better safety, security and competitiveness on European level. The Unit conducts pre-normative research towards related European standards for safety and security, addressing sustainability and efficiency issues in close collaboration with European Standardisation Organisations and policy makers.
Title of the JRC proposed Activity:	Combined seismic and energy retrofitting of existing buildings
Short description of the proposed activity:	<p>The fellow will carry out research on the development of novel techniques combining advanced construction materials for the simultaneous seismic and energy retrofitting of reinforced concrete and masonry building envelopes. The effectiveness of the developed retrofitting system(s), which is applied to the building envelope, will be validated numerically and experimentally, both in terms of energy efficiency and seismic performance.</p> <p>The work will involve one or more of the following:</p> <ul style="list-style-type: none"> - Set-up numerical and experimental models (i.e. design of an existing deficient building / building envelope elements, design of the test set-up(s) for thermal and seismic testing). - Perform energy and seismic simulations (numerical / experimental) for buildings in both their as-built and retrofitted states - Perform data analysis and write experiment report - Write scientific articles.
Required profile of the Partner Institution:	University or Research Institution with sound expertise in the field of Engineering and/or Architecture, with research activities in areas such as:

	<ul style="list-style-type: none"> • Energy efficient buildings, i.e. thermal evaluation of buildings experimentally and numerically • Structural mechanics, i.e. seismic assessment and retrofitting of existing buildings • Advanced materials for building (seismic and/or energy) retrofitting applications
<p>Required profile of the researcher/expert (that will implement the activity)</p>	<p>Experience/Qualifications:</p> <ul style="list-style-type: none"> - Degree in civil/structural engineering, earthquake engineering or related field. - PhD or at least 5 years of professional experience in a field relevant to the position would be an asset.

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	15
JRC Directorate	E – Space, Security & Migration
Unit	E.4 – Safety and Security of Buildings
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	Unit JRC.E.4 – Safety and Security of Buildings performs research related to the security, safety and efficiency of buildings and physical infrastructures and their critical elements to create harmonized guidelines for better safety, security and competitiveness on European level. The Unit conducts pre-normative research towards related European standards for safety and security, addressing sustainability and efficiency issues in close collaboration with European Standardisation Organisations and policy makers.
Title of the JRC proposed Activity:	Numerical simulations of human brain vulnerability to blast loading
Short description of the proposed activity:	<p>The recent terrorist attacks have intensified the need for more research related to the protection of public spaces (soft targets). Understanding better the effects of blast waves on humans, and the human brain in particular, will contribute to the work on the assessment of potential human injuries and on the development of appropriate mitigation strategies.</p> <p>Computational models (explicit finite element method), which are a fast and reliable tool for analysing blast effects on structures, can also be used to analyse blast effects on humans. The Unit has done research on the topic and there are computational models of the effect of blast waves on rat heads.</p> <p>The activity consists of (a) further developing a model for human brain under blast loading and (b) making parameter studies in order to investigate the brain behaviour under different blast loading conditions. The explicit finite element software EUROPLEXUS will be used.</p>
Required profile of the Partner Institution:	University or Research Institution with a department of Engineering and/or Mathematics and/or Physics

Indicative required profile of the researcher/expert (that will implement the activity)	University degree in civil/structural engineering or mathematics or physics or a related field. PhD in a related field would be an asset. Previous research or professional experience relevant to the topic of the call and experience in the use of explicit finite element method (FEM) software would be an asset.
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MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	16
JRC Directorate	E - Space, Security & Migration
Unit	E.4 - Safety and Security of Buildings
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	Unit JRC.E.4 – Safety and Security of Buildings performs research related to the security, safety and efficiency of buildings and physical infrastructures and their critical elements to create harmonized guidelines for better safety, security and competitiveness on European level. The Unit conducts pre-normative research towards related European standards for safety and security, addressing sustainability and efficiency issues in close collaboration with European Standardisation Organisations and policy makers.
Title of the JRC proposed Activity:	Numerical simulations of glass windows/facades under blast loading
Short description of the proposed activity:	<p>The recent terrorist attacks have intensified the need for more research related to the protection of public spaces (soft targets) and buildings. A particular risk for buildings loaded by blast waves is the failure of glass elements (windows, facades etc.).</p> <p>Glass is the most fragile part of a building, and exposed to an explosion it breaks down into harmful splinters, which accelerated by the blast represent a serious hazard for the human body. Computational models (explicit finite element method) are a fast and reliable tool for analysing blast effects on structures in terms of their mechanical response.</p> <p>The activity consists of (a) developing models for the simulation of different glass types, windows and/or facades under blast loading and (b) making parameter studies in order to investigate their behaviour and generate iso-damage curves (PI-curves). The explicit finite element software EUROPLEXUS will be used.</p>
Required profile of the Partner Institution:	University or Research Institution with sound expertise in Engineering and/or Mathematics and/or Physics
Indicative required profile of the researcher/expert	University degree in civil/structural engineering or mathematics or physics or a related fields. Applications from students

(that will implement the activity)	currently preparing a thesis for an MSc/PhD degree are eligible. PhD in a related field would be an asset. Previous research or professional experience relevant to the topic of the call and experience in the use of explicit finite element method (FEM) software would be an asset.
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MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	17
JRC Directorate	F – Health Consumers and Reference Materials
Unit	F.1 – Health in Society
Location	JRC, Ispra, Italy
Short description of the activities of the Unit	<p>The Health in Society Unit supports EU policies in public health, to promote excellence and equality of health-care in all Member States and to facilitate the implementation of associated EU legislation. This includes: i) prevention of non-communicable diseases; ii) improved health information on cancer and rare diseases; iii) harmonisation of cancer healthcare quality. Some of the Unit's outputs can be seen here:</p> <p>https://ec.europa.eu/jrc/en/health-knowledge-gateway</p> <p>https://ec.europa.eu/jrc/en/news/supporting-rare-diseases-data-sharing-eu-level-more-effective-patient-care</p> <p>https://ecibc.jrc.ec.europa.eu/</p> <p>https://ecis.jrc.ec.europa.eu/</p>
Title of the JRC proposed Activity:	Evidence for better mental health policies across the EU
Short description of the proposed activity:	<p>One of the Unit activities is the Health Promotion and Disease Prevention Knowledge Gateway, a reference point for public health policy makers on topics related to the promotion of health and well-being, in particular the prevention of non-communicable diseases.</p> <p>The proposed activity will develop content for the Knowledge Gateway (KG) in the area of mental health and in particular:</p> <ul style="list-style-type: none"> • Develop a content plan for extending the scope of the KG to Mental Health • Refine and prioritise content based on input and discussions with EU Member State representatives • Systematically search and review literature as well as data collection and analysis. This includes scientific literature but importantly relevant policy actions to address mental health issues. The development of surveys, focus groups or other targeted actions can be considered for gathering such data. • Drafting of "Briefs" (see methodology and editorial process)

Required profile of the Partner Institution:	University or Research Organisation with sound expertise in the areas of public health and/or medical sciences, education, training or science communication activities (preferably including provision of expert advice in the area of health).
Indicative required profile of the researcher/expert (that will implement the activity)	Degree related to Life, Medical Sciences and/or Public Health. Expertise on Mental Health issues and its societal implications would be an asset;

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	18
JRC Directorate	F - Health Consumers and Reference Materials
Unit	F.2 – Consumers Products Safety
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>The directorate F Health Consumer and Reference Materials has a state-of-the-art equipped laboratory for Nanobiotechnology studies. Its institutional work focuses on a science-based understanding of nanomaterial properties and their interactions with biological systems in order to support the safe and sustainable development of nanotechnology. This is carried out by a multidisciplinary group of chemists, physicists, biologists, and materials scientists with extensive experience in the fields of nanobiosciences and materials science.</p> <p>With a wide range of facilities and cutting-edge instrumentation, the laboratory fosters interdisciplinary studies, with a special emphasis on characterisation of nanomaterials, nanomedicines, and advanced materials and their interactions with biological systems.</p>
Title of the JRC proposed Activity:	Bioaccumulation of nanomaterials in human cells and its biological consequences
Short description of the proposed activity:	<p>Growing scientific evidence is pointing to the induction of inflammatory responses after exposure to various types of nanoparticles. Depending on the route of exposure and the distribution of the nanomaterial such inflammatory responses can occur in various parts of the body. Local chronic inflammation has been reported in lung tissues as a result of nanoparticle exposure leading to frustrated phagocytosis and the production of reactive oxygen species. In particular in the light of the asbestos disaster¹, these findings require further attention. Another recent scientific report on food grade TiO₂ that impairs intestinal and systematic immune homeostasis triggered discussion among regulatory scientists involved in the regulation of TiO₂. The accumulation of TiO₂ in cells of the Peyer's Plaque of the gut is suggested as a key mechanism leading to chronic inflammatory processes². Since only very little information on accumulation of</p>

¹Sinis SI, Hatzoglou C, Gourgoulis KI, Zarogiannis SG (2018) Carbon Nanotubes and Other Engineered Nanoparticles Induced Pathophysiology on Mesothelial Cells and Mesothelial Membranes. *Front Physiol.* Mar 29;9:295. doi: 10.3389/fphys.2018.00295eCollection 2018.

²S & Boutet-Robinet, Elisa & Cartier, Christel & Coméra, Christine & Gaultier, Eric & Dupuy, Jacques & Naud, Nathalie & Taché, Sylviane & Grysan, Patrick & Réguer, Solenn & Thieriet, Nathalie & Réfrégiers, Matthieu &

	<p>nanomaterial in cells and the biological consequences are available, the European Union Observatory for Nanomaterials requested further reviews on the bioaccumulation of nanoparticles in cells in its delegation agreement of the European Union Observatory for nanomaterials and the European Union Chemicals legislation finder³. The accumulation of nanomaterial in diverse cell types and the potential biological effects such as chronic inflammation could be seen as a current knowledge gap in safety assessment of nanomaterial.</p> <p>In recent in-house studies the JRC could demonstrate that cell cultures of various cell types exposed for short term periods accumulated the nanomaterials for several weeks (unpublished data). However, the understanding of mechanistic effects and long term consequences on cell functions and the activation of the immune system by nanoparticle loaded cells are still unknown.</p> <p>The proposed activity is focussed on further explore the impact of physicochemical characteristics of particles on the bioaccumulation in various cell types, the consequences on cell functioning and the activation of the immune system in order to better understanding the long-term effects induced by the accumulation of nanoparticles in cell types. Such knowledge is relevant to judge whether local inflammatory processes induced by the accumulation of nanomaterials is currently an underestimated risk in safety assessments of nanomaterials. It should be envisaged to submit the results to the European Union observatory for nanomaterials.</p>
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution with sound experience in Nanotechnology.</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Biochemist, Pharmacologist, (molecular) biologist or related disciplines with knowledge in immunology .</p> <p>A PhD and practical laboratory experience in one or more of the techniques to be used in the project would be an asset.</p>

Thiaudière, Dominique & Cravedi, Jean-Pierre & Carriere, Marie & Audinot, Jean-Nicolas & Pierre, Fabrice & Laurence, guzylack-piriou & Houdeau, Eric. (2017). Food-grade TiO2 impairs intestinal and systemic immune homeostasis, initiates preneoplastic lesions and promotes aberrant crypt development in the rat colon. Scientific Reports. 7. 10.1038/srep40373.

³ GROW.DDG1.D.3 (06/12/2016) DELEGATION AGREEMENT ON THE EUROPEAN UNION OBSERVATORY FOR NANOMATERIALS AND THE EUROPEAN UNION CHEMICAL LEGISLATION FINDER <http://ec.europa.eu/DocsRoom/documents/20432>

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	19
JRC Directorate	F - Health consumers and reference materials
Unit	F.2 Consumer Products Safety
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>The directorate F Health Consumer and Reference Materials has a state-of-the-art equipped laboratory for Nanobiotechnology studies. Its institutional work focuses on a science-based understanding of nanomaterial properties and their interactions with biological systems in order to support the safe and sustainable development of nanotechnology. This is carried out by a multidisciplinary group of chemists, physicists, biologists, and materials scientists with extensive experience in the fields of nanobiosciences and materials science.</p> <p>With a wide range of facilities and cutting-edge instrumentation, the laboratory fosters interdisciplinary studies, with a special emphasis on characterisation of nanomaterials, nanomedicines, and advanced materials and their interactions with biological systems.</p>
Title of the JRC proposed Activity:	Study of Inter individual variations of immune responses against to emerging health products such medical devices
Short description of the proposed activity:	<p>Advanced Materials have the potential to revolutionize a wide range of medical diagnostic and therapeutic interventions such as diagnostic imaging, photothermal therapy, nucleic acid delivery, implantable devices, and drug delivery. To ensure an effective and safe use of these advanced materials for medical applications, the interaction between the material and the biological system of interest must be well studied and characterized.</p> <p>The immune system must receive particular attention since components of the immunological system can recognise the material as "foreign" and initiating immunological responses resulting in severe adverse effect for the patient. Importantly, the ‘one material fits to all’ concept is not applicable because of the known inter-individual diversity of the human immune system.</p> <p>This issue has been documented in ‘The 10,000 Immunomes Project’ (http://dx.doi.org/10.1101/180489) where differences in immune-response for different categories of individuals (gender, age and races) were identified. Regulatory bodies are increasingly aware of the situation and released guidance in 2017 in which they recommended the use of methods/tools based on human cells or human derived material.</p>

	<p>The goal of the proposed activity is to study the inter-individual immune responses after exposure to emerging health products such as emerging (nano) material used for health applications (medical devices), therapeutic proteins and their generics. It will focus on the development of a method aiming at detecting with high sensitivity selective marker indicating various immune reactions in a small volume of blood. Detection techniques such as high throughput ELISA and Surface plasmon resonance will be used. The method will improve the preclinical product development by integrating the variability of human immune responses in safety assessments. In addition, the method can be used for personalised treatment strategies of patients before innovative health products are administered. Such method will contribute to the implementation of personalised medicine because personalised therapies means also to match patient immunology.</p> <p>The inclusion of the method and protocol into documentary standards is envisaged at the end of the project.</p>
<p>Required profile of the Partner Institution:</p>	<p>Research institution with emphasis on studies of interactions between nanomaterials and biological systems for safety assessment and medical applications.</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Chemist, Biochemist, Pharmacologist, Biologist or related field of study.</p> <p>PhD and practical laboratory experience in one or more of the techniques to be used in the project would be an asset</p>

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	20
JRC Directorate	F - Health consumers and reference materials
Unit	F.2 Consumer Products Safety
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>The directorate F Health Consumer and Reference Materials has a state-of-the-art equipped laboratory for Nanobiotechnology studies. Its institutional work focuses on a science-based understanding of nanomaterial properties and their interactions with biological systems in order to support the safe and sustainable development of nanotechnology. This is carried out by a multidisciplinary group of chemists, physicists, biologists, and materials scientists with extensive experience in the fields of nanobiosciences and materials science.</p> <p>With a wide range of facilities and cutting-edge instrumentation, the laboratory fosters interdisciplinary studies, with a special emphasis on characterisation of nanomaterials, nanomedicines, and advanced materials and their interactions with biological systems.</p>
Title of the JRC proposed Activity:	Characterization Methods and Standards for nanoparticles for biological, medical, and food applications
Short description of the proposed activity:	<p>There is a growing interest in the use of nanoparticles for innovative applications in different fields, such as diagnostic devices, medical applications, and the food sector.</p> <p>The development of new materials for those fields requires the characterization of nanoparticles in complex matrices such as food or biological systems. Such characterization is particularly challenging, but it is a pre-requisite to assure the quality and safety of new materials.</p> <p>The proposed activity will develop improved methods and protocols for the accurate characterization of relevant nanoparticles for applications in the medical/biological field or food sector.</p> <p>The work should also lead to the development of appropriate protocols with the goal to later develop them into documentary standards in collaboration with partner international institutions, such as NIST.</p>
Required profile of the Partner Institution:	University or Research Institution with sound expertise in the field of chemistry and pharmacy, with advanced research activities and PhD programs in areas such as nanotechnology

Indicative required profile of the researcher/expert (that will implement the activity)	Chemistry, Biochemistry, Pharmacology, Physics, Food Science or related field of study. PhD and practical laboratory experience in one or more of the techniques to be used in the project would be an asset.
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MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	21
JRC Directorate	F - Health consumers and reference materials
Unit	F.2 Consumer Products Safety
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>The directorate F Health Consumer and Reference Materials has a state-of-the-art equipped laboratory for Nanobiotechnology studies. Its institutional work focuses on a science-based understanding of nanomaterial properties and their interactions with biological systems in order to support the safe and sustainable development of nanotechnology. This is carried out by a multidisciplinary group of chemists, physicists, biologists, and materials scientists with extensive experience in the fields of Nanobiosciences and materials science.</p> <p>With a wide range of facilities and cutting-edge instrumentation, the laboratory fosters interdisciplinary studies, with a special emphasis on characterisation of nanomaterials, nanomedicines, and advanced materials and their interactions with biological systems.</p>
Title of the JRC proposed Activity:	Personalised protein corona determination for assessing Nanoparticles safety.
Short description of the proposed activity:	<p>Upon contact with a biological fluid, nanomaterials are rapidly covered by a proteins layer i.e. protein corona which depends on the nanomaterials characteristics (Monopoli et al. doi:10.1038/nnano.2010.267). It is acknowledged that this protein corona plays an important role in the nanoparticle recognition by the immune cells. The composition of the protein corona is known to depend on the surface properties of the nanoparticles and the biological environment with which they are interacting. Proteins from the corona may undergo to conformational changes exposing unknown epitopes recognized by the immune cells. Immune cells do not recognize the NP itself but the proteins forming the corona which may have different conformation. Recent studies demonstrated that the composition of the protein corona formed around nanoparticles when in contact with human serum differs very much between individual because individuals have different plasma proteome that depend on their health conditions, gender, lifestyle, and genetic fingerprint. (DOI: 10.1039/c6bm00921b)</p>

	<p>The proposed activity will develop a method to relate the composition of the protein corona formed around nanomaterials to the immune responses for their safety assessment. Screening of the protein corona identity will be performed versus nanoparticle surface properties. Serums from different donors will be tested to assess the inter-individual variation of the corona composition and related immune-response.</p> <p>A new method and protocol enabling the better understanding of the mechanisms of interaction between nanomaterials proteins and the immune system will open up many opportunities to design safe nanomaterials or to tune immune responses towards preventing or curing diseases (Boraschi et al. Current Opinion in Toxicology 2018, 10:74–83). The inclusion of the method and protocol into documentary standards is envisaged at the end of the project.</p>
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution with sound expertise in Nanotechnology in particular in studies of interactions between nanomaterials and biomolecules for safety assessment and medical applications</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Chemist, Biochemist, Pharmacologist, Biologist or related field of study.</p> <p>PhD and practical laboratory experience in one or more of the techniques to be used in the project would be an asset.</p>

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	22
JRC Directorate	F - Health consumers and reference materials
Unit	F.2
Location	ISPRA
Short description of the activities of the Unit	<p>The directorate F Health Consumer and Reference Materials has a state-of-the-art equipped laboratory for Nanobiotechnology studies. Its institutional work focuses on a science-based understanding of nanomaterial properties and their interactions with biological systems in order to support the safe and sustainable development of nanotechnology. This is carried out by a multidisciplinary group of chemists, physicists, biologists, and materials scientists with extensive experience in the fields of nanobiosciences and materials science.</p> <p>With a wide range of facilities and cutting-edge instrumentation, the laboratory fosters interdisciplinary studies, with a special emphasis on characterisation of nanomaterials, nanomedicines, and advanced materials and their interactions with biological systems.</p>
Title of the JRC proposed Activity:	Development, standardization and knowledge transfer of methods for characterization of health products containing soft materials
Short description of the proposed activity:	<p>There is a growing interest in the development of soft materials for use in health products. Soft materials such as therapeutic protein conjugates, polymer complexes, liposomes, biomaterials, are very complex objects to analyze and there is still need for improved methods and standards for their characterization.</p> <p>The collaboration activity should take advantage of the instrumentation and expertise existing in the Nanobiotechnology laboratory to develop methods to improve the characterization of one or more classes of soft materials used in health products taking into account regulatory requirements.</p> <p>The project should also develop protocols for the measurements, with a plan to later standardize the most promising ones.</p> <p>Integral part of the activity will be the transfer of the acquired knowledge, ideally targeting relevant communities in the Balkan region and developing countries.</p>
Required profile of the Partner Institution:	University or Research Institution with sound knowledge and expertise in the fields of biotechnology, as well as, with sound expertise in developing and transferring innovative technologies for production and quality control.

Indicative required profile of the researcher/expert (that will implement the activity)	Chemist, Biochemist, Pharmacologist, Biologist or related field of study. PhD and practical laboratory experience in one or more of the techniques to be used in the project would be an asset.
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MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	23
JRC Directorate	F - Health Consumers and Reference Materials
Unit	F.3 Chemical Safety and Alternative Methods
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	Priorities of the unit's work include the advancement of <i>in vitro</i> and computational methods for regulatory safety assessment of chemicals and for application in basic and applied research. The unit incorporates the JRC's EU Reference Laboratory for alternatives to animal testing (EURL ECVAM) and is also a member of the steering committee of the European Partnership for Alternative Approaches to Animal Testing (EPAA). The unit participates heavily in OECD programmes including co-chairing the OECD Advisory Group on Molecular Screening and Toxicogenomics that is responsible for the OECD programme on Adverse Outcome Pathways.
Title of the JRC proposed Activity:	In vitro assays and high throughput screening for the safety and efficacy assessment of novel molecules intended as therapeutic agents or cosmetic ingredients
Short description of the proposed activity:	Focus will be on the implement of a series of high throughput screening (HTS) and high content imaging studies using novel assays and selected molecular libraries. This could include 'disease in a dish' assays based on the co-culture of cells composing specific organs. Contribute to the organisation of a joint JRC-ICGEB international workshop together with LNBio (Brazil) on the application of in vitro HTS methods and organ-on-chip technologies to the screening (efficacy and toxicity) of new molecules derived from plants
Required profile of the Partner Institution:	University or Research Institution with a sound experience in advanced research in molecular biology and biotechnology and in particular in biological assay development and validation for characterizing the bioactivity of molecules, synthetic nucleic acids or biological vectors
Indicative required profile of the researcher/expert (that will implement the activity)	Expert in the development and application of in vitro assays suitable for high throughput and high content (e.g. imaging, transcriptomics) screening of molecules to assess their bioactivity.

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	24
JRC Directorate	F - Health consumers and reference materials
Unit	F.4 – Fraud Detection and Prevention (in collaboration with Openlab facilities of F2 for Nanosensors)
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	F4 Unit activities are focused on the production, collection and validation of the evidence base necessary for detecting and preventing fraud in the food chain and contributing to the fight against illicit consumer products
Title of the JRC proposed Activity:	New sensitive detection methods of harmful substances and dangerous chemicals, using Surface enhanced Raman spectroscopy
Short description of the proposed activity:	Nanosensors for sensing devices are ubiquitous in many domains of application ranging from industrial process control to environment monitoring, healthcare and biosecurity. One of the most demanding areas in healthcare domain of applications concerns the need for advanced in vitro diagnostics for biomarker detection for early cancer diagnosis. Nanosensors are as well highly required for the detection and identification of illicit drugs at customs and chemical/biological agents for biosecurity applications. The goal of the project is to develop a method based on Surface Enhanced Raman spectroscopy or surface plasmon resonance platform to enable the detection of illicit substances and dangerous chemicals with portable equipment at trace level and without manipulation of the sample. The project objective could focus, as a first case study, on the detection of new synthetic opioids which are structural derivatives of the synthetic drug “fentanyl.”
Required profile of the Partner Institution:	University or Research Institution with a sound experience and expertise in Nanotechnology in particular for the development of sensing devices based on Raman Spectroscopy using nanoparticles enhancement.
Indicative required profile of the researcher/expert (that will implement the activity)	Chemist, Biochemist, material scientist. PhD and practical laboratory experience in one or more of the techniques to be used in the project would be an asset.

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	25
JRC Directorate	F - Health, Consumers & Reference Materials (F)
Unit	F.5 - Food and Feed Compliance
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	JRC's Food and Feed Compliance Unit is hosting, among other tasks, the EU Reference Laboratory for Genetically Modified Food and Feed (EURL GMFF) which plays a central role in the EU approval of genetically modified organisms (GMOs) and in ensuring the harmonised and efficient functioning of the EU official control system. Over the years the EURL GMFF has gained worldwide reputation in testing and validating analytical methods for GMO detection. It is also steering the European Network of GMO Laboratories (ENGL) in the development of new analytical approaches for the screening and identification of EU authorised and unauthorised GM events and in the provision of guidance on performance criteria for their assessment. The EURL GMFF further provides rapid assistance to Member States (MS) in emergency situations through <i>in silico</i> cross reactivity analyses, validation of analytical tools and preparation of DNA-based control samples. The JRC/EURL GMFF has also played a crucial role in the surveillance of transgenic sequences of approved GMOs.
Title of the JRC proposed Activity:	Next Generation Sequencing for detecting products from Genetic Engineering
Short description of the proposed activity:	EU legislation guarantees the availability of reliable analytical tools, such as validated methods, control samples and Certified Reference Materials (CRM), for the detection of authorised GMOs. However, cost-efficient and reliable testing approaches have also to be implemented to address the development of new GM products observed worldwide which are not already authorised in the EU. The ever-increasing number and complexity of GMOs entering the market challenges the sustainability of an analytically demanding legal framework. For many Genetic Engineered (GE) products which have not been submitted to the EU authorisation procedure, detection methods and/or reference materials are not available. Moreover, information on their transgenic sequences may often be missing or is not sufficiently reliable. In recent years multiple cases of unauthorised GMOs have been detected in open fields or on the EU market (e.g. GM rice, GM papaya, GM petunia, GM <i>Bacillus subtilis</i> and GM fish). These emerging threats have challenged the official control

	<p>system and demand the development of reliable methods for timely surveillance actions. New technologies, such as Next Generation Sequencing (NGS) make it affordable to determine with increasing accuracy target DNA regions or entire genomes and provide an alternative analytical strategy for the identification and characterisation of GE products.</p> <p>The project aims at the development of an efficient system for the detection of EU authorised and unauthorised GE products by NGS. This approach may also allow the identification of sequencing errors or mutations in already accepted GMOs or stacked GM events which represent a regulatory challenge for their proper risk management.</p> <p>The candidate will join the JRC facility for NGS sequencing equipped with IonTorrent S5 and the Oxford Nanopore platforms and will collaborate in setting up an NGS approach using targeted enrichment methods for the detection of GE products, including those not authorised for food, feed or cultivation purposes in the EU.</p> <p>The feasibility of the proposed NGS approach will be assessed by experiments and data processing results.</p>
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution with an active research area and sound expertise in genomics and molecular biology</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Solid background in molecular biology and expertise on DNA extraction, PCR technologies and NGS experiments. Experience in NGS data analyses and bioinformatics would be an added value.</p>

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	26
JRC Directorate	F – Health, Consumers and Reference Materials
Unit	F.7 – Knowledge for health and consumer safety
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	The mission of F.7 is to support EU policies on consumers, food safety and health by mapping, collating, analysing, quality checking and communicating in a systematic and digestible way all the relevant scientific data, methods, tools and knowledge available worldwide respect to their impact on policy.
Title of the JRC proposed Activity:	Development of a sequence-signatures-fishing bioinformatics pipeline.
Short description of the proposed activity:	Public genomic, metagenomic, metatranscriptomics and sequencing data in general are becoming an invaluable resource for meta-analysis, allowing to quickly increasing our knowledge for answering to the most diverse questions while reducing the need to generate new data. Indeed, large scale data produced within a specific study are being often used to answer questions which go beyond the original scope for which the data were initially produced. This is an inherent quality of large scale genomic data. Starting from these considerations, it is here proposed to develop a bioinformatics pipeline to identify specific user-selected sequence markers and signatures from large and public collections of sequencing data. Specifically, the main scientific interest is the capability of recognize sequence fingerprints as molecular markers in sequence data deriving from the most diverse environments and samples to answer to questions such as: is there any synthetic sequence in (meta-)genomics data? Is there any association between mobile elements activity and specific diseases or phenotypic traits? Has a specific virus infected a given cohort of individuals? To answer these and many other similar questions, once identified the specific sequence signatures, it is fundamental to fish them in a big collection of sequencing data. This activity hopefully will culminate in the development of a computational tool that will assist in doing that, implemented as a modular bioinformatics pipeline. Specific care needs to be given in the choice of the algorithm to use for the search to optimize the sequence search in a huge database. For instance it will explore the possibility to use algorithms such as Sequence Bloom Trees that have been proven to allow such searches over a reasonable amount of time (https://www.nature.com/articles/nbt.3442). However, specific

	<p>study will be performed at the beginning of the Collaboration on the most updated literature to choose the most updated and optimized strategy. The pipeline will be modular allowing for great flexibility and user manoeuvring for infinite expandability over the time based on community needs and requirements. Two test case searches will be used as pilot and proof of concept into the initial development: 1) search for identification of fingerprints of artificial sequences in large whole metagenomics sequencing datasets from environmental samples; 2) search for identification of target site duplication (TSD) as marker of retrovirus/transposon activity in large metatranscriptomics sequence datasets from neurodegenerative disorder disease samples.</p>
<p>Required profile of the Partner Institution:</p>	<p>University or Research Institution recognised as scientific centre of excellence within the national and international academic scene, with relevant research activities in Mathematics, Computational Biology, Bioinformatics applied to Omics and Neuroscience. High quality scientific works carried out by its researchers are expected to be published regularly in leading international journals with a high impact factor, including the most prestigious scientific journals. Occurrence of collaboration agreements with other world's leading research institutes and universities is also highly desired.</p>
<p>Indicative required profile of the researcher/expert (that will implement the activity)</p>	<p>Expert in bioinformatics/computational biology, with special skills on data integration and harmonization, development of tools, methods and databases for large-scale functional genomics data analysis.</p>

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	27
JRC Directorate	G – Nuclear Safety and Security
Unit	G7 – Nuclear Security
Location	JRC, Ispra (Italy)
Short description of the activities of the Unit	<p>The Nuclear Security Unit is focused on state of the art enabling research, the use of specific technology, development of instruments and methods, delivering technical services and training in the domain of nuclear safeguards, non-proliferation and nuclear security. In this way, the unit supports the verification of international treaties and agreements related to nuclear safeguards and non-proliferation.</p> <p>Inter alia, the Nuclear Security Unit develops tools for the acquisition, processing and visualization of 3D data that support nuclear safeguards inspectors during the verification and monitoring of nuclear facilities.</p>
Title of the JRC proposed Activity:	Multi-sensor data analysis for 3D mapping and analysis
Short description of the proposed activity:	<p>The researcher will develop algorithms for the processing and analysis of multi-sensor data, including mobile 3D laser scanners and optical imagery. The algorithms will apply to 3D mapping and scene understanding, for example in the context of Cultural Heritage, emergency response and (nuclear) facility inspections. The activity will include algorithm development and prototyping.</p>
Required profile of the Partner Institution:	University or Research Institution with a research group active in Computer Vision and 3D data processing with experience in sensor fusion and analysis of multi-sensor data.
Required profile of the researcher/expert (that will implement the activity)	Proven track-record in research and development in 3D Computer Vision with an interest in sensor fusion, localisation & mapping and classification. The researcher should combine a strong theoretical background with the interest and skills for algorithm implementation.

MoU JRC – FVG
AREA 1 – Mobility Scheme
JRC proposed Activity

Reference no.:	28
JRC Directorate	I - Competences
Unit	I.4 - Intellectual Property and Technology Transfer
Location	JRC HQ Brussels (Belgium)
Short description of the activities of the Unit	Unit JRC.I.4 is responsible for managing the IP portfolio of the European Commission and promoting collaboration on technology transfer. It supports DG NEAR to develop capacity building in the Western Balkan regions and DG REGIO in the analysis of innovation ecosystems, and manages the TTO Circle network of the Technology Transfer Office of 30 large research organisations in Europe. The Unit is in the process of setting up a "Competence Centre on technology transfer" in support of policies.
Title of the JRC proposed Activity:	Collaboration on technology transfer and innovation with focus on the Western Balkan Region
Short description of the proposed activity:	The proposed activity includes contributions to: <ol style="list-style-type: none"> 1. Technology transfer and innovation, in support of the selected European (macro-) regions (Western Balkans, Danube, Adriatic-Ionian). 2. Technology Innovation Monitoring for innovative technology-based start-ups. 3. Setting up in 2019 of a Competence Centre on technology transfer in support of policies.
Required profile of the Partner Institution:	University or Research Institution with a proven practical expertise in innovation and technology transfer and a volume of innovation activities (startups, spinoffs, scale ups, projects) sufficiently large which would allow to complement the policy-support activities with field experience.
Required profile of the researcher/expert (that will implement the activity)	Expertise in technology transfer. Background could be either scientific, technical, business and/or economic