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**Partner search**

**Date (DD-MM-YY)**

* **(\*) Indicate numbers of relevant topics for Green Deal call:**

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| **LC-GD-8-1-2020-Innovative, systemic zero-pollution solutions to protect health, environment and natural resources from persistent and mobile chemicals** |

* **Quick description of the project**

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| **(describe the objectives, activities, partners requested and their skills)** |

* **(\*) Do you intend to apply as ? :**

**Coordinator: No**

**Participant: Yes**

**(\*) Either Description of the expertise requested (up to 1000 characters) - *specify which points of the "expected impact" of the call you are targeting***

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| **Xxxxxxxxx****+ key words :**  |

**Or Description of the expertise proposed (up to 1000 characters) - *specify which points of the "expected impact" of the call you are targeting***

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| * At DES/IRESNE/DTN/SMTA/LMTE**:**
* **Transfer in porous media/soil** (reactive transport modelling)
* **Transfer in atmosphere** (multi-scale modelling of the dispersion – local to continental)
* **Hydrologic transfers** (modelling of flow and transport in aquifers and rivers)
* **Transfers between Human and biotope** (modelling transfer to flora and fauna)
* **Safety assessment and site impact calculations** (regulatory).

*Main contact person:**Olivier BILDSTEIN***olivier.bildstein@cea.fr*** At DES/ISAS/DPC/SECR**:**
* **Behaviour of radionuclides and trace metals in soil, sediment and aquifer** : Lab experiments + modeling
* **Modeling of retention, transport and soil/plant transfer**.
* **Impact of physico-chemical properties of these media on contaminants fate**. Field + Lab characterization

Expected impact on * Knowledge improve on the behavior of hazardous contaminant in trace level in the terrestrial environment
* Soil remediation by selecting high-performance plant technologies for contaminant scavenging and their industrial valorization.

*Main contact person:**Christelle LATRILLE***Christelle.LATRILLE@cea.fr*** At DRT/Leti/DTBS :

-“**To detect/monitor pollutants in the environment**”: expertise on detection/monitoring devices and more precisely on sample collection/preparation/pre-concentration and microfluidic integration for miniaturized and autonomous devices. - “**To develop innovative bio-remediation technologies**”, microalgae can be used to study the impact of pollution on the environment and/or naturally detoxify the environment: we have expertise in imaging technologies (Lens Free for instance) that can be used for real-time monitoring of algae growth and metabolism, and providing miniaturized devices for measurements on the field.**-“To better understand the impact on health of pollutants (and pharmaceuticals)”,** organ-on-chip (OoC) can mimic the body response to such exposures (low doses, mixtures, etc..). We have a strong expertise in microfluidics and sensor integration for OoC or other 3D in-vitro models.*Main contact person: Caroline Desvergne***caroline.desvergne@cea.fr*** At [ICSM](http://www.icsm.fr/icsm_engl/):
* **Green chemistry for metal ions extraction** by **developping new synthesis for systems such as complexing molecules, porous organic membranes for filtration, ionic liquids as specific solvant , with limiting number of synthesis steps and toxic chemical species** (as an example, biosourced phenolic resins synthesized without phenol and without formadéhyde); **stephane.pellet-rostaing@cea.fr**
* **Development of organic solvants for ion extraction based on hydrotropes to limit the amount of aliphatic or aromatic solvants** (for example synergetic extraction coupling a specific non-toxic ionic hydrotrope and a complexing molecules, or still the development of biosourced oleo-eco-extraction of antioxydant from plant for cosmetics); **stephane.pellet-rostaing@cea.fr****;** **olivier.diat@cea.fr****;** **thomas.zemb@cea.fr**
* **Replacing classical surfactant and detergent by specific and non toxic nanometer-sized ions** (as an exemple, an increase by a factor 10 the solubilization of organic compounds in water using specific nanoions); **olivier.diat@cea.fr**
* **Development of ion flotation** (95% of air, no organic solvant) **as a modular and cyclable concept for ion extraction using non-ionic foaming agent** - an eco-concept;**olivier.diat@cea.fr**
* **Dissolution, solubilization, green chemistry applying mechanical action on the matter using ultrasound waves at specific frequencies** - sonochemistry concept limiting the use of toxic catalytic compounds. **serguei.nikitenko@cea.fr**
* **Ion ion (co-)extraction, ion (co-)separation and (co-) ion (co-)condensation with high added value for new products that reduces the cost of the overall process and produces low amount of wastes**. **daniel.meyer@cea.fr**
* Using **biosourced waste for making new materials for ion separation or detection** **xavier.deschanels@cea.fr**
* **Control of toxic metal ion speciation to limit or understand mobility of toxic element in geological media**; **nicolas.dacheux@cea.f**
* **Characterizing, evaluating and simulating** the various technical steps of these developments - **development of operando methods of characterization, thermodynamical multiscaled simulation of ion mobility in various media and of ion separation** **renaud.podor@cea.fr****;** **jean-francois.dufreche@cea.fr**
* At [DRF/IRAMIS/NIMBE](http://iramis.cea.fr/nimbe/index.php) : Expertise in **wastes treatments and recycling including**: (i) waste sorting using **advanced sorting technologies** (including TRL4-5 demonstrators); (ii) **hydrometallurgy process development**, including solid-liquid, liquid-liquid; **microfluidics**; **green solvents** (ionic liquids and supercritical fluids); **lixiviation, separation. Activated extraction using microwave and ultrasounds**; (iii) **electrodeposition**, including in green solvents; (iv) d**epollution, recycling and pyrolysis of plastics**.

*Main contact person:**Jean-Christophe P. GABRIEL***jean-christophe.gabriel@cea.fr*** At [DRF/NIMBE/LIONS](http://iramis.cea.fr/nimbe/lions/index.php) + [DRF/JOLIOT/I2BC](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/I2BC_saclay.aspx) : **Micro and nanoplastics behaviour in the environment; Stability of plastics in the environnement, interaction with biological components; Identification and quantification of microplastiques; Plastic pollution capture**
* *research and development of remediation technologies of contaminated soil and water contaminated by persistent and mobile substances and their precursors;*
* *development of new cost-effective high-resolution methods to measure persistent and mobile chemicals in different media;*
* *environmental and human (bio)monitoring  of persistent and mobile chemicals;*
* *gathering of toxicity and toxico-kinetic information (including in vitro and in silico approaches) in order to allow characterising all risks to human health and ecosystems, at low environmental levels;*
* *development and improvement of models to predict and assess long-term trends and risks for persistent mobile substances;*
* *development of best practices for the management of waste containing persistent and mobile substances;*

 *Main contact person: Jean-Philippe RENAULT* **jean-philippe.renault@cea.fr** *+ Yves Boulard* **yves.boulard@i2bc.paris-saclay.fr*** At [DRF/ IRIG/DIESE/SyMMES](http://www.cea.fr/drf/irig/english/Pages/Departments/Diese.aspx): **biomonitoring** for the **better understanding of the relevance of pollution** to human health, the improvement of **risk assessment** and for the evaluation of the **efficiency of depollution solutions**.

Expertise in the **toxicity of chemical and physical agents,** among which organic pollutants, nanoparticles, UV and ionizing radiations, metals and oxidative stress. Strong interest in **mixture effects**and their impact on risk assessment.Studied toxicological endpoints: **formation and** **repair of DNA damage**, with detection of **DNA adducts** (HPLC-mass spectrometry), **DNA strand breaks** (Comet assay) and imaging-based **high throughput approaches**. Various **cellular response** (apoptosis, metabolism, production of ROS). HPLC-MS quantification of **biomarkers in biological fluids**. In house **in vitro models** (2D cultures, co-cultures, and organoids) and **in vivo** samples in collaborative projects*Main contact person: Thierry DOUKI* **thierry.douki@cea.fr*** At [DRF/NIMBE/LICSEN](http://iramis.cea.fr/nimbe/licsen/index.php):

- **Design and manufacture of selective sorbent polymer nanofibers and microfibers** for polluting species present in water or in soils (heavy metals, phytosanitary compounds, radionuclides).- **Industrial manufacturing of filtering advanced geotextile** with selective chemical sorption properties. Expected solution on :- Advanced geotextile for **protection against contamination of natural surface water and underground water below or near industrial sites** that pollute or present risks.- **Filtering water runoff, leaks and accidental spills of polluting liquids** from chemical product storage areas, storage basins or landfill sites for polluting industrial waste, mining residues, etc.- **Protection against contamination of natural surface water and underground water below or near agricultural surfaces using phytosanitary products** based on copper salt, glyphosate, paraquat. Fight against the biological consequences of the use of Bordeaux mixture (**French Bouillie Bordelaise**).- **Chemical advanced geotextile placed on the surface, buried in soil or integrated into a draining tube for agricultural areas** on viticulture and arboriculture domains.*Main contact person:Pascal VIEL* **pascal.viel@cea.fr*** At [DRF/NIMBE/LIONS](http://iramis.cea.fr/nimbe/lions/index.php) :
* **Photo, radio and mecanocatalysis for persistant pollutant remediation**

**Proof of photo, radio and mecanocatalysis as a zero pollution solution** for persistant chemicals remediation through **analysis of the catalysts mechanisms and aging, and of their potential intrinsic toxicity**. * **Rapid toxic characterization by advanced ion mobility technics** in relation to “environmental and human (bio)monitoring of persistent and mobile chemicals”

*Main contact person: Jean-Philippe RENAULT* **jean-philippe.renault@cea.fr** * At [DRF/IBFJ/IRCM/SDRR/LDG](http://jacob.cea.fr/drf/ifrancoisjacob/english/Pages/Departments/IRCM.aspx):

Our laboratory (LDG) sat up **experimental models (culture and xenograft)** to investigate the **toxicity of pollutants in the human developing gonads**, fulfilling the gap between rodents and epidemiological studies, to provide an improved risk assessment related to the **impact of pollutants on the human reproductive function**. Expected impact:- **Improved risk assessment** to facilitate optimal risk **management****- Better** **understanding of emerging and a persistent pollution problem** of human and environmental health relevance*Main contact person:**Pr Gabriel LIVERA***gabriel.livera@cea.fr*** At [DRF/IBJF/Genoscope/L2BMS - Equipe Bioremédiation](http://jacob.cea.fr/drf/ifrancoisjacob/english/Pages/Departments/Genoscope.aspx)**:** Current work dealing with the previously unknown **transformation pathways of** a persistent pollutant, the **pesticide chlordecone**, **by diverse environmental bacterial species** 🡨 🡪 Better understanding of an acute and persistent pollution problem of human and environmental health relevance

**Expertise and facilities for setting up anaerobic cultures and isolation of bacterial species** from complex consortia. **Sequencing facilities, expertise in genome annotation, pathways identification, reconstruction of metabolism, inferring the function of genes of unknown function** to propose new pathways. **Biochemistry and enzymology**. **Implementation of gene knock-out disruption technologies and genetic manipulations** 🡨 🡪 Solutions for better (bio)remediation and detection technologies*Main contact person:**Cécile FISCHER***fischer@genoscope.cns.fr*** At [DRF/IBJF/Genoscope/LGBM](http://jacob.cea.fr/drf/ifrancoisjacob/english/Pages/Departments/Genoscope.aspx)**:** Current work dealing with the **generation of a library of possible transformation products** for a given persistent organic chemical such as **chlordecone** using **bioinspired chemical strategies** in order to decipher the real fate of persistent organic pollutants in the environment.

**Detection and identification of transformation products of persistent organic pollutants** using GC- and LC- (MS/HRMS) chromatography techniques, NMR analysis and organic synthesis 🡨 🡪 development of analytical procedures**Development of analytical procedures** 🡨 🡪 Improved risk assessment to facilitate optimal risk management **Assessment of confidence intervals** 🡨 🡪 Data of regulatory relevance accessible to policy makers and for risk communication*Main contact person: Pierre-Loïc SAAIDI***plsaaidi@genoscope.cns.fr*** At [DRF/JOLIOT/I2BC/SB2SM](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/I2BC_saclay/sb2sm.aspx): In the frame of the "expected impact" "Better understanding of emerging and a persistent pollution problem of human and environmental health relevance " we propose to **analyze the influence of PFAS** (per- and polyfluoroalkyl substances) **on the growth and photosynthetic (CO2-sequestrating) metabolism of cyanobacteria** the widely-diverse prokaryotes that colonize most marine-, brackish- and fresh-waters and sustain a large part of the biosphere (production of organic assimilates for the aquatic food chains). Reciprocally we will **analyze the influence of cyanobacteria, natural strains and relevant stress resistant/sensitive mutants** from our collection, on the stability of selected PFAS in the frame of the expected impact "Solutions for better (bio)remediation and detection technologies, including real time monitoring approaches"

*Main contact person:Franck CHAUVAT* **franck.chauvat@i2bc.paris-saclay.fr*** At [DRF/JOLIOT/I2BC](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/I2BC_saclay.aspx): **Photosynthetic organism**; Bioremediation; **Removal of toxic heavy metals from soil or polluted wate**r; **Monitorin**g (heavy metals +PFAS+herbicides) via alterations of photosynthesis; Plants- soil; Alage aquatic freshwater + marine; Moss lichens : air; **Chlorophyll fluorescence, advanced spectroscopy; Antioxydant system** (ROS EPR, enzymatic activities, biochemistry)

*Main contact person: Anja KRIEGER-LISZKAY* **anja.krieger-liszkay@cea.fr*** At [DRF/JOLIOT/SPI/LEMM](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/medicines_healthcare_technologies/spi.aspx): We develop and validate **animal (rat, mouse, NHP) and human cellular models of BBB**. We **compare and characterize the brain penetration and neurotoxicity profile of drug candidates and nanoparticle**s, **identify molecular signatures** characterizing neurotoxicity mechanisms of these molecules, ultimately develop **integrated models of neurotoxicity**.

*Main contact person: Aloïse MABONDZO* **Aloise.MABONDZO@cea.fr*** At [DRF/JOLIOT/SPI/Li2D](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/medicines_healthcare_technologies/spi.aspx): To search/define relevant biomarkers or signatures with **Omics technologies (proteogenomics, metabolomics**) and breakthrough methods such as **ecotoxicoproteomics** and the use of **sentinel animals**. In the field of **diagnosis without a priori  in microbiology**, researchers of Li2D recently proposed a new technology, **phylopeptidomic**, allowing the **quick identification of all pathogenic biological agents in mixture** and to **quantify by high resolution mass spectrometry**. The potential of this technology has been validated in national exercises aimed at the identification of highly pathogenic microorganisms in complex environments. The mastery of high-resolution mass spectrometry technologies for the analysis of proteins and massive sequencing approaches of genomes has also provided the development of **new concepts of proteogenomics** and opens the possibility of several applications including the analysis of **complex microbiota**.

New technologies for **evaluating biomass contributions and microorganism functioning**, technologies for **accurate taxonomy and biomass quantification**. **Effect of the fermented food** on long-term, microbiome and the host. Tools for **immunophenotyping analyses**.*Main contact person: Jean ARMENGAUD* **jean.armengaud@cea.fr*** At [DRF/JOLIOT/SPI/LEMM](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/medicines_healthcare_technologies/spi.aspx): Development of **methods for metabolomic, lipidomic and glycomic analysis** by mass spectrometry. **Mass spectrometry applied to therapeutic and biomarker**. Through its technology and know-how, our laboratory tries to meet the challenges of the pharmaceutical industry in the coming years. Firstly of all, the advent of products derived from so-called recombinant technologies has led to the development of **new therapeutic concepts**: **recombinant proteins** (eg humanized antibodies), **siRNAs or antisense oligonucleotides**. These developments involve original structural characterization and quantification techniques that we propose to the pharmaceutical and agro-food industry.

*Main contact person: François FENAILLE***Francois.FENAILLE@cea.fr*** At [DRF/JOLIOT/SPI](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/medicines_healthcare_technologies/spi.aspx): **Small Molecules Analysis by Mass Spectrometry**

SMArt-MS is a platform dedicated to the **absolute quantification of small molecules, drugs, metabolites and biomarkers in biological fluids**. This platform comprises 5 liquid chromatography instruments together with mass spectrometers triple quadrupole analyzers (UPLC-MS/MS). SMArt-MS can access if needed to the high-resolution instruments of MetaboHUB platform. Our missions are:* **Development and validation of quantitative bioanalysis methods** by LC-MS/MS of small molecules in biological fluids and achievement of the analyzes using these methods
* The **realization of metabolism and pharmacokinetic pilot studies** (early ADME-DMPK)

*Main contact person: Alain PRUVOST***Alain.PRUVOST@cea.fr*** At [DRF/JOLIOT/SHFJ/TIRO-MATOs](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/SHFJ.aspx): We are developing **in vitro cellular models** to better understand the **mechanisms involved in uranium accumulation in the bone matrix and its chemical toxicity**, as well as to **assess new decorporation agents** for this element. Both synthetic and biomimetic bone matrices containing natural uranium are being generated to perform 3D cell cultures. The consequences of uranium exposure to bone cell functions are being analysed by **various molecular and cellular biology techniques**, as well as through **spectroscopic, proteomics and metabolomics approaches.**

*Main contact person: Georges CARLE* **Georges.Carle@unice.fr** * At [DRF/JOLIOT/SHFJ/TIRO-MATOs](http://joliot.cea.fr/drf/joliot/en/Pages/research_entities/SHFJ.aspx):

We are developing **in vitro and in vivo models** to better assess the **behavior and influence of synthetic and biogenic nanoparticles on cells, on tissues and within living organisms**. We combine approaches ranging from **in vitro and in vivo diffusion models, non-invasive live cell cycle monitoring using quantitative phase imaging, proteomics and metabolomics exposure signatures on tissues and biofluids, micro SPECT/CT live imaging.***Main contact person: Béatrice CAMBIEN* ***beatrice.cambien@unice.fr**** At DRF/BIAM :
* Solutions for **better load reduction, (bio)remediation and detection technologies**, including **real time monitoring approaches**; Detection of bioavailable fraction of toxic metals using protein engineering, protein evolution, and development of ratiometric biosensors.Identification of proteins involved in metal trafficking and chelation, towards bioremediation strategies Exploitation of the diversity of cyanobacteria for the bio-mineralisation of toxic metals and radionuclides
* **Better understanding and modelling of environmental fate and degradation pathway**

Towards a better understanding and prediction of toxic metal transfer into ecosystems by mechanistic approaches : analysis of the influence of (radioactive)metal speciation in metal uptake into water and in ecosystems, role of microorganisms in metal bioavailability, identification of proteins involved in metal trafficking and chelation*Main contact person: Catherine BERTHOMIEU* **catherine.berthomieu@cea.fr****+key words :**  |

**Organisation information**

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| **Organisation and country:****The French Alternative Energies and Atomic Energy Commission (CEA), France** |
| **Type of organisation:** **□ Enterprise □ SME ⌧ Academic ⌧ Research institute ⌧ Public Body □ Other: Association** |
| **Former participation in FP European projects?** **⌧ Yes □ No** |
| **Web address:**[**http://www.cea.fr/english**](http://www.cea.fr/english) |
| **Description of the organisation:**The French Alternative Energies and Atomic Energy Commission (CEA) is a key player in research, development and innovation in four main areas: defense and security, low carbon energies (nuclear and renewable energies), technological research for industry, fundamental research in the physical sciences and life sciences. |

**(\*) Contact details**

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| **Contact person name** |  |
| **Telephone** |  |
| **E-mail** |  |
| **Country** |  |

**(\*) –Mandatory**