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Horizon2020@recherche.gouv.fr

**Partner search**

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

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

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| **LC-GD-6-1-2020-Testing and demonstrating systemic innovations in support of the Farm-to-Fork Strategy** |

* **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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| * Subtopic A 🡪 The LEMiRE ([DRF/BIAM](http://biam.cea.fr/drf/biam/english)) is involved in **improving plant tolerance to water stress** through the integration of exopolysaccharide (EPS) producing bacteria that improve soil structure, water retention and thus the water and mineral supply to plants. The transformation of root exudates by the PSE-producing bacteria may also **contribute to the storage of carbon in the soil.** *Main contact person: Wafa ACHOUAK* **wafa.achouak@cea.fr**
* Subtopic A 🡪[DRF/ LSCE/Archives&Traceurs](https://www.lsce.ipsl.fr/en/Phocea/Vie_des_labos/Ast/ast_service.php?id_unit=50): **soil science and 14C as a tool** to evaluate the state of soil health (**assessment of soil carbon stock and long-term storage capacities**), the **soil history** and to assess the **efficiency over time of restoration methods and/or sustainable agriculture** *Main contact person:* *Christine HATTÉ* **christine.hatte@lsce.ipsl.fr**
* Subtopics A, B, C 🡪 [DRF/LSCE/Cycle&Transfert](https://www.lsce.ipsl.fr/en/Phocea/Vie_des_labos/Ast/ast_service.php?id_unit=51): **precision farming and decision support tools :**  the **upscaling and multicriteria analysis** of the impacts of innovative practices to reduce farm scale GHG emissions is a challenge given that field trials cannot cover all climate regimes, soil types, practices and their effect on all variable. The **CLAND Convergence Institute** (<https://cland.lsce.ipsl.fr>) regroups 100 researchers from CEA, CNRS, INRAE and AgroParisTech focused on **agriculture adaptation to global change** **and GHG emissions mitigation from farm to regional and global scale using models and data mining / AI**. Development of **advanced process based models of soil GHG emissions** including microbial C,N, P processes and the stabilization of soil organic matter through sorption and interactions with mineral soils and dynamic plant inputs and soil physics. Those models can be calibrated from field data (data from the project and data mined from literature) and a) integrated from multifactorial simulations to **provide an integrated assessment of GHG budgets** (CO2, N2O and CH4) **for different practices and their uncertainties**, b) integrated across space using **geospatial land use and management data** (across Europe), c) integrated in time for **future scenarios** to address the question of the optimality additionality and permanence of GHG reductions under future climate conditions. Output of complex models can also be substituted by machine learning or meta-models to derive a **decision support web-based tool** for evaluating the multiple impacts of practices that will be considered in the project. *Main contact person: Philippe CIAIS* **philippe.ciais@cea.fr**
* Subtopics A, B, C 🡪 [DRF/LSCE/Climat&Cycle](https://www.lsce.ipsl.fr/en/Phocea/Vie_des_labos/Ast/ast_service.php?id_unit=52): **precision farming and decision support tools :**  **Climate extreme and rare events** (like heatwaves, cold spells, extreme precipitation or storms) and their **statistical and mathematical modelling.  Attribution of extreme events** (EEA)/ "**conditional attribution**", i.e. how the probability of an event is affected by forcings (anthropogenic or not) with focus on the relation between the atmospheric circulation and the observable on which the extreme is detected (e.g. cumulated precipitation, average temperature, max temperature...) and look at recurrence properties of atmospheric patterns, and how those properties can change. One of the outcomes of this research on the properties of the atmospheric circulation is the development of **stochastic weather generators** that sample the invariant measure of an underlying attractor. This allows simulating large ensembles of climate sequences, with various hypotheses of external climate forcings. *Main contact person:Pascal YIOU* **pascal.yiou@lsce.ipsl.fr**
* Subtopic C 🡪At [DRF/IRAMIS/NIMBE/LIONS](http://iramis.cea.fr/nimbe/lions/index.php)we have developed a **nanoclay able to stabilize the oxidative power of H2O2**. It also forms a **film on leafs**. We have started exploring the use of this **nanomaterial as a potential solution to replace harmful copper** based products in the vine industry. *Main contact person: Antoine THILL***antoine.thill@cea.fr**
* Subtopic C 🡪 The LMiRE ([DRF/BIAM](http://biam.cea.fr/drf/biam/english)) brings together researchers in microbiology, molecular biology, ecology, plant-bacteria interactions and bioinformatics. Studies are conducted at microbial community, cell and molecular levels using multidisciplinary approaches. Research in LEMiREis devoted to the study of the interactions between plants and phytobeneficial bacteria and on the role of small non-coding RNAs in adaptive response of root-associated bacteria to withstand environmental fluctuations. LEMiREhas extensive experience in **microbial ecology** and has developed **various programs on the characterization of bacterial communities’ structure and functions in various environments**. The team has gained experience in **exploiting the potential of microbial diversity for sustainable solutions in crop protection against disease and pests** in the frame of two project:

**DIETETIC** (**GNIS)** Bacterial genomes sequencing and exploration via *in silico* screening of insecticidal molecules against corn *Diabrotica* larvae. **MOPAD**  (**BPI-France)**: Biological control agents based on microorganisms to protect common wheat against *Fusarium* head blight. *Main contact person: Wafa ACHOUAK* **wafa.achouak@cea.fr*** Subtopic C🡪 At I2BC([DRF/JOLIOT/I2BC](https://www.i2bc.paris-saclay.fr/spip.php?rubrique36)), the “Biochemistry, Biophysics and Structural Biology**”** department is involved in the following activities: **Photosynthetic organism**; **Bioremediation**;

**Removal of toxic heavy metals from soil or polluted water**; **Monitoring (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)**; **Photosynthetic apparatus/light reactions***Main contact person: Anja KRIEGER-LISZKAY* **anja.krieger-liszkay@cea.fr*** Subtopics C, D, E 🡪 Expertise at [DRT/Leti/DTBS](http://www.leti-cea.com/cea-tech/leti/english)

C: “to reduce the dependency on the use of hazardous pesticides and fertilizers”: expertise on **detection/monitoring devices** and more precisely on **sample collection/preparation/pre-concentration and microfluidic integration** for miniaturized and autonomous devices. Expertise for **benchmark analysis on sensing devices and associated analytical challenges** (lifetime, quality validation, detection of family compounds, etc..)D: “to decrease the dependency on antimicrobials”, it is of utmost to be able to specifically and early detect bacterial contamination in breeding or aquaculture. We offer innovative and easy to use in the field devices allowing the **fast characterization of bacteria**. Our expertise is based on either **imaging technologies** such as lens free technology, or **biochemical approaches**, and provide **fully integrated systems** from the sample preparation to the detection that can be also adapted for air analysis.E: “to decrease food losses and waste”, we have expertise in innovative and easy to use in the field **microfluidic devices to detect contaminated food** (pathogens or chemicals like metals/pesticides) including sample preparation, and allowing a **better management of production chains**. *Main contact person: Caroline DESVERGNE***caroline.desvergne@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**