**Post-doctoral position in Multi-omics for Exobiology**

**Project proposal for the Centre National d’Etudes Spatiales (CNES) – 1 year renewable 1 year**

**Closing date: 25st of March 2019**

**Innovative multi-omics strategies to investigate Solar system’s metabolome**

**Context**
The detection of organic biomarkers in objects of the Solar System has become a key challenge in astrobiology in order to understand their potential role in the development of biochemical and catalytic systems, features of life. Until now, GC-MS analysis has been the techniques of choice allowing the detection of building blocks (e.g. amino acids, sugars, nucleobases). However, to detect these molecules, samples must be submitted to chemical treatments under severe conditions (high temperature, strong acid for hydrolysis, reactive chemicals for derivatisation). Such manipulations are likely to lead to secondary chemical reactions that are difficult to control and that may override the nature of the sample (fragmentation reactions, oxidations, rearrangements, racemisation). As a result, the obtained data can sometimes lead to discussions on possible false positives related to the formation of interfering compounds. The confirmation and enlargement of the range of biomarkers that can be found in the Solar System requires the emergence of innovative strategies.

**Project**
In this context, the objectives of the project we plan to propose to the CNES for a post-doctoral fellowship is to develop a versatile analytical platform based on UPLC-HRMS (Q-Exactive) and UPLC-MS/MS (triple quadrupole) instrumentation, with the aim (1) to detect in a highly specific and sensitive manner and without any sample’s chemical pre-treatment, the building blocks of life in meteorites or laboratory analogs of interplanetary bodies, (2) to demonstrate the presence of peptide sequences and (3) to elucidate their amino acids sequences. The second objective of the proposal is to investigate the chirality of the peptides-constitutive amino acids in order to determine if there is an enantiomeric excess of these sub-unities and analyse by liquid chromatography coupled to tandem mass spectrometry the evolution of this excess as a function of the length of peptide sequences.

The analytical configurations and methods developed thanks to this platform should provide a first “metabolomic” scan of unprocessed extra-terrestrial samples, and therefore guide the subsequent specific analyses in accredited laboratories (by HRMS infusion and/or derivatization-GC-MS).

**Profile**
Interested applicants have to contact Pauline Poinot. Once selected, the applicant should have to submit this project with their profile to the CNES. An audition at the CNES will be performed at the CNES. After a positive answer, the post doctorate will start its contract in October 2019 and be based in Poitiers. This project will be developed in collaboration with Grégoire Danger from the Aix-Marseille University.

Applicants should have a PhD in analytical chemistry and biochemistry, metabolomics, or proteomics, and be motivated by multidisciplinary projects (astrobiology, astrochemistry, chemistry).

Please submit a single PDF containing your current curriculum vitae (including list of publications), contact information for two professional references, and a cover letter describing your interest in the position and how your qualifications meet the criteria outlined above.

**Contacts**
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