Internship in the laboratory of Chemical Engineering, Applied Thermodynamics and Biosystems at Institut Pascal (Université Clermont Auvergne, Clermont-Ferrand, France)

Important before reading further: You need to be currently enrolled in a university, pursuing a graduating degree. The entity which will sign the internship agreement is a university laboratory, not a company.

Context of the internship: the laboratory of Chemical Engineering, Applied Thermodynamics and Biosystems at Institut Pascal has been a partner of the European Space Agency (ESA) MELiSSA project for over 30 years and focuses, among other things, on biophysical models of the MELiSSA loop. We want to precisely characterize mass and energy transfers in plants using artificial leaves. We are in the process of developing an experiment to be tested in 1g first and perhaps in transient microgravity (parabolic flight), in steady microgravity (ISS), and in hypergravity (centrifuge). We are also working on refining models of plant growth in space and of space greenhouse subsystems.

Tasks to be completed during the internship:
Your main tasks will be to assist in the experiment development and test. This includes (but is not limited to):

- Programming a Raspberry Pi computer.
- Connecting various sensors (anemometers, hygrometers, thermocouples) to the data acquisition platform.
- Assembling the experimental set-up.
- Designing experimental tests to assess the experimental set-up.
- Acquisition, post-processing, and analysis of data.
- Writing test reports and presenting the results in internal scientific meetings.

You will also be tasked with reading scientific literature and providing comprehensive literature reviews on various topics pertaining to plant growth models, space greenhouses, space ecology and closed ecosystems, as well as mass and energy transfers. This list is not exhaustive.

Requirements

- Ability to work and read scientific documents in English.
- Ability to work and communicate effectively with a team in English.
- Knowledge of basic thermodynamics and energy transfers.
- Programming languages (at least one): Python, MATLAB.
- Strong interest in human space exploration and closed-loop life-support systems.

Assets

- Experience with Raspberry Pi and Arduino.
- Experience with experiment development.
- Experience in data acquisition and analysis.
- Statistics.

Logistics

- Timeframe: February – September 2023
- Duration: at least 4 months

If you are interested in this position, please send a CV and a cover letter to Lucie Poulet at lucie.poulet@uca.fr before 15/12/2022.