

PRESELECTION FOR RESEARCH CONTRACT ASSOCIATED TO EUROPEAN PROJECT USABLE PACKAGING

Position's characteristics

6-month research contract (extendable to 3 years for completion of a PhD thesis) is offered by the Group of Environmental Biotechnology (Biogroup) of the University of Santiago de Compostela to work in the European project "Unlocking the potential of sustainable biodegradable packaging" (USABLE PACKAGING). The contract includes an approximate gross salary of 1200 €/month and 14 payments/year. The contract starting date is approximately November 1 2019.

Project description

The production of high performance biodegradable plastics from non-food organic raw matter is the ambitious objective of H2020 Project USABLE Packaging. The challenges inherent to the production of high performance bioplastics are multiple. First, residue biomass must be converted in volatile fatty acids, the substrates that microorganisms use to accumulate bioplastics. This accumulation process must be done under controlled conditions to achieve the requirements as mechanical properties, oxygen and water vapour barrier properties, etc. Finally, bioplastic must be processed and combined to match the characteristics requested by final users.

Biogroup's participation focuses on three aspects: 1) the production of bioplastics by an innovative route: the accumulation by halophile bacteria in a saline medium; 2) development of mathematical models at metabolic level to predict the transformation of biomass into volatile fatty acids and ultimately into bioplastics; and 3) the holistic evaluation of the environmental impact of all the production and after end-of-life treatment by life-cycle assessment methodology. The candidate will work on aspects 2) and 3), using mathematical models to design biomass conversion processes and integrating the model outputs into an assessment of the product/process environmental impacts.

Biogroup is one of the most important research groups in Environmental Engineering at European level. As part of a world renowned research group you will work at state-of-the-art lab facilities with the support of experienced technicians. Biogroup staff is composed by 9 full/assoc. professors, 9 postdocs and ~25 PhD students providing a stimulating and multidisciplinary work environment to conduct your research.

Research area

Multiscale modelling of the production and sustainability of novel bioplastics: from the metabolic description to the life cycle assessment.

Supervisors

Almudena Hospido and Miguel Mauricio Iglesias

Brief work description

- Revision of the state-of-the-art related to LCIA models applied to plastics and bioplastics for posterior LCA of USABLE products and standard peers
- Development of metabolic model to describe the production of VFA from waste biomass by mixed culture fermentations and further transformation into PHA.
- Knowledge integration of VFA/PHA production models and LCA for a holistic design of a sustainable bioplastic value-chain.

Requirements

- Candidates must have a University degree (master) in Applied Mathematics, Chemical Engineering or Environmental Engineering. (15 points)
- Candidates must have a clear interest in developing a research career culminating in the completion of a PhD thesis.
- Candidates must show the ability to travel abroad to attend project meetings or conferences.
- Experience in mathematical modelling, programming and the use of scientific software (e.g. Matlab, Octave, Python, etc.) will be appreciated, especially if applied to metabolic-level models (20 points).
- Experience in Life Cycle Thinking methodologies, especially in LCIA models will be appreciated (20 points)
- Candidates must be skilled in problem solving and understanding of complex scientific texts. (15 points)
- Candidates must have good communication skills as well as proficiency in written and spoken English language (15 points)

Selection process

Applications must be sent to both miguel.mauricio@usc.es and almudena.hospido@usc.es (including in the subject: “USABLE PhD position”) before 19th August 2019 at 10:00.

Applications must contain the following documents:

- Motivation letter (not more than 1 page), indicating the contact details of the candidate and a brief description of the reasons why he/she should be selected.
- Curriculum Vitae
- Name and contact of two references (e.g. former supervisors)

The selection process involves the following steps:

1. Evaluation of applications (motivation letter and CV)

The adequacy of applicant’s profile to the requirements of the call will be tested. It is a qualifying stage and it accounts for 55% of the total score.

2. Screening test

Successful candidates from the first stage will be invited to a qualifying screening test, which will account for 30% of the total score. The objective of this test is to evaluate candidate’s competency to develop a research career, problem solving as well as his/her reading and writing skills in English.

3. Personal interview

Top five successful candidates from the second stage will be invited for a personal interview accounting 15% of the total score.