

PRESELECTION FOR RESEARCH CONTRACT ON BIOPROCESS MODELLING AND OPTIMISATION

Position's characteristics

6-month research contract (extendable to 3 years if completion of a PhD thesis) is offered by the Group of Environmental Biotechnology (Biogroup) of the University of Santiago de Compostela. The contract includes an approximate gross salary of 1300 €/month and 14 payments/year. The contract starting date is approximately November 1, 2020.

Project description

Biological transformations present a vast unleashed potential to produce chemicals from low-cost raw materials in an environmental friendly manner. This project focuses on the use of mathematical programming to facilitate the design of novel bioprocesses in a biorefinery framework. In particular, the describing biological reactions at metabolic level it is possible to simulate, test, design, upscale and optimise the transformation of biomass in added-value products, including bioplastics. In particular, it is proposed to extend the use of residues as raw materials in mixed-culture fermentations, which has been tackled mathematically by previous work at Biogroup (Regueira et al. 2020)¹ to other sources of residual biomass. Ultimately, by facilitating the design and early-stage economic evaluation of developing bioprocesses, this project supports decision-making and the implementation of biorefineries at demo or full scale.

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 11 full/assoc. professors, 8 postdocs and ~20 PhD students providing a stimulating and multidisciplinary work environment to conduct your research.

Research area

Computer-aided design of bioprocesses for the sustainable production of chemicals

Supervisors

Miguel Mauricio Iglesias and Juan M. Lema

Brief work description

- Development of bioprocess model to support the design and upscale of polyhydroxyalkanoate (bioplastic) production
- Development of metabolic models to describe the production of volatile fatty acids from residual matter
- Integration of metabolic models in a framework for bioprocess design

Requirements

- Candidates must have a University degree in Chemical Engineering, Environmental Engineering, Applied Mathematics, Physics or similar.
- An interest in developing a research career culminating in the completion of a PhD thesis will be valued.

¹ Regueira, A, Lema, JM, Carballa, M, Mauricio-Iglesias, M. Metabolic modeling for predicting VFA production from protein-rich substrates by mixed-culture fermentation. *Biotechnology and Bioengineering*. 2020; 117: 73– 84. <https://doi.org/10.1002/bit.27177>

- Experience in mathematical modelling, programming and the use of scientific software (e.g. Matlab, Octave, Python, etc.) will be appreciated, especially if applied to biochemical models and biosystems
- Candidates must be skilled in problem solving and understanding of complex scientific texts
- Candidates must have good communication skills as well as proficiency in written and spoken English language

Selection process

Applications and information requests must be sent to miguel.mauricio@usc.es (including in the subject: "ALQUIMIA position") before September 29th at 9:00 am.

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 they should be selected.
- Curriculum Vitae
- Name and contact of two references (e.g. former supervisors)

The preselection process involves the following steps:

1. Evaluation of applications (motivation letter and CV)

The goal of this evaluation is to assess the adequacy of applicant's profile to the requirements of the call.

2. Personal interview

Top five candidates after CV screening will be invited for a personal interview