

RESEARCH CONTRACT ASSOCIATED TO MICROPLASTIC DEGRADING BACTERIA IN SEWAGE TREATMENT PLANTS

Position's characteristics

6-month research contract (extendable for completion of a PhD thesis) is offered by the Centre for Cross-disciplinary Research in Environmental Technologies (CRETUS) of the University of Santiago de Compostela to work in the Project "Degrading-plastic bacterial communities in activated sludge from wastewater treatment plants (PlasticBugs)".

The contract includes an approximate gross salary of 1200 €/month and 14 payments/year. The contract starting date would be between July and September 2021.

Project description

Up to 80% of plastic residues reach the ocean in the form of microplastics through the rivers, which receive most of them from wastewater plants, although they remove up to 99% of the microplastics they receive. Most of those microplastics are retained in the sludge, creating a very distinctive environment in the bioreactor creating an ideal environment for the development of a genetic specialization, usually related to xenobiotic degradation.

The aim of this project is to isolate and characterize bacterial communities able to degrade some of most common plastics found in a WWTP. To that aim, we will consider the activated sludge from the aerobic reactor as a source of plastic degrading bacteria. Bacteria are able to use microplastics as a substrate to grow and form a biofilm, creating distinctive populations, different than those on the surrounding. PlasticBugs aims to i) characterize the microplastic content and fate in the wastewater treatment plant; ii) characterize the whole population present in the bioreactor by using the state-of-art sequencing technologies; and iii) isolate and characterize a bacterial consortium able to degrade plastics, as well as characterize the specific routes and interactions among individuals.

PlasticBugs is a multidisciplinary project where Microbiology, Analytical chemistry and Environmental engineering fields converge in the frame of a collaboration of two of the biggest singular research centers of the USC, CIQUS and CRETUS, from where the project is coordinated.

The researcher will incorporate to the CRETUS Center that comprises 50 professors, 20 postdoctoral researchers and 70 PhD students. The researchers have a common interest in the field of environmental technologies with a clear environmental commitment to sustainable development that responds to the demands and challenges of society. In addition to high-quality research, other strategic action lines are devoted to the promotion of research talent, innovation and dissemination of different interests either in academia, industry or society.

Research area

Characterization and monitoring of wastewater microplastics by bacterial communities present in activated sludge.

Supervisors

Sabela Balboa and Juan Lema

Brief work description

- Operation of a pilot scale activated sludge plant for the study of the behavior of microplastics sorbed onto sludge
- Characterization of microplastics in wastewater treatment plants sludge.
- Study of the plastic degrading bacterial population present in the activated sludge: metagenomics and metatranscriptomics.

Requirements

- A Master Degree in Environmental technology, Chemical engineering or Biotechnology will be appreciated.
- Candidates must have a clear interest in developing a research career culminating in the completion of a PhD thesis.
- Candidates must have a good level in English.
- Candidates must show the ability to travel abroad to attend project meetings or conferences.

Selection process

Applications must be sent to sabela.balboa@usc.es (including in the subject: "PlasticBugs PhD position") before 4th June 2021 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 and Academic Record in Bachelor and Master

The selection process involves the following steps:

1. Evaluation of applications (based on the documents provided).
The adequacy of applicant's profile to the requirements of the call will be tested. It is a qualifying stage and it accounts for 30% of the total score.
2. Screening test
Selected candidates from the first stage will be invited to a qualifying screening test, which will account for 25% of the total score. The objective of this test is to evaluate candidate's competency to develop a research career as well as his/her reading and writing skills in English.

3. Personal interview

Successful candidates from the second stage will be invited for a personal interview in which, among others, his/her oral skills in English will be assessed. The personal interview and English level account for 25% and 20%, respectively, of the total score.

The selected candidate will be invited to start the administrative procedure at USC to sign the research contract and a waiting list with the following 3 candidates will be elaborated.