Position Offered: UNIVERSITY GRADUATE

Project: Development and implementation of computational tools for analysis, massive processing and integration of multi-omics data for functional engineering of microbial communities of biotechnological interest.

Technological and scientific fields: Data analysis and integration, Massive data and information processing technologies, Biotech, Artificial intelligence, Advanced data analytics / edge computing, Computational biology

Location: Mutilva, Navarra, IDAB-CSIC, https://www.idab.csic.es

Research Group/PI: Biotechnology, Edurne Baroja

PROJECT SUMMARY

Understanding the mechanisms that determine the dynamics and functioning of microbial communities in their respective natural environments (i.e., soil, etc.) and hosts (intestinal, respiratory microbiome, etc.) is essential for their biotechnological exploitation. The General Objective of this project is to equip IDAB with the capacity and autonomy in the analysis and integration of multi-omic data related to the composition, activity, function, interaction, and modulation of microbial communities, both in natural and synthetic habitats, through the use of massive data processing technologies. To achieve this, we propose (i) to develop and implement multi-data processing and integration tools, as well as (ii) to advance towards the contemporary design of biotechnological tools for engineering microbial communities, with applications in agriculture, health, and climate.

PROFESSIONAL PROFILE

Minimum requirements:

Graduate/Degree in at least one of the following fields: Biology, Biochemistry, Biotechnology, Computer Science, Mathematics, or Data Science. Proficiency in programming languages for managing biological data, preferably Python or R. Ability to write and read in English.

Merits to be considered:

Knowledge of other programming languages (Unix, Java...). Experience in analyzing large biological data sets from microbial communities. Ability to convey complex analysis results to personnel not familiar with computing environments. Experience in managing bioinformatics units. Experience using computing clusters (High Performing Clustering).

WHAT IS OFFERED

During the execution of this project, we will establish the necessary bioinformatics methods and pipelines for: 1) Acquisition of multi-omic data from biological communities regardless of their origin; 2) Processing of these data at the taxonomic and functional levels within each origin domain, exploring the use of machine learning (ML); 3) Global integration of all microbial communities to describe their dynamics, as well as modeling important communication or interaction nodes. The candidate will work in collaboration with six groups from the center, with interests ranging from plant biology to human health, in an interdisciplinary environment with microbial communities and their interactions as a common interest. This contract has a strong training component (total of 240 ETCS), to provide the contracted person with high-level skills in digital competencies for multi-omic data analysis, massive processing, and modeling, using the most advanced bioinformatics analysis tools. This includes a Master's Degree in Artificial Intelligence, attendance at the FISABIO Summer School, HarvardX courses and two three-month stays each at EMBL-EBI in the United Kingdom and BSC-CNS in Barcelona, both world-leading centers in supercomputing applied to bioinformatics.

Contract conditions:

Indefinite contract for a University Graduate associated with the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary (37.000 € - 41.000 €).

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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