Job description

Title: Advanced Strategies for Smart Biomanufacturing in Biofoundries
Researcher profile: Doctoral candidate.
Type of contract: Temporary.
Job status: Full-time.
Duration: 36 months.
Application deadline: March 2026
Envisaged job starting date: June 2026.

Hiring organisation and offer posting contact details

Organisation: Spanish Council for Scientific Research, I2SysBio-CSIC.
Number of positions available: 1.
Country: Spain.
Address: I2SysBio-CSIC/UV, Escardino 9, 46980 Paterna, Spain.

Application and Contact

Please submit your application no **later than March 31th 2026.** Send your motivated application, CV, and exam certificates to Pablo Carbonell (pablo.carbonell@csic.es).

If you would like additional information about the position, please also contact Pablo Carbonell.

All interested candidates irrespective of age, gender, race, disability, religion or ethnic background are encouraged to apply.

Offer description

Objectives:

1) Improve the biomanufacturing efficiency through a combination of advanced computational and experimental techniques (in model organisms such as *P. pastoris* and *C. necator*), along with AI-driven tools for bio-retrosynthesis-based metabolic pathway design, enzyme design and optimization, and DNA part selection. **2)** knowledge-graph-based combinatorial experiment designs are used to span multiple scales, while Multiobjective optimization strategies ensure improvements in efficiency across various biomanufacturing scales.

Expected results:

1) Development of innovative bio-based production methods tailored to meet specific target property requirements. These methods will leverage new-to-nature metabolic pathways, ensuring the efficient production of food ingredients and proteins. **2)** A multi-scale strategy will be implemented to design and optimize these metabolic pathways, integrating insights from various biological scales.

Required skills/qualifications:

Candidates should hold a degree in biotechnology, synthetic biology, systems biology, applied mathematics (or a related subject area), interested in biomanufacturing in biofoundries, and have technical skills in computer programming and basic knowledge of mathematical models for systems and/or synthetic biology. A secondment at the Technical University of Berlin, Germany, lasting a total of six months, is an integral part of the PhD program.

FrameBio project:

FrameBio (Multiscale Frameworks for BioSolutions) is a project funded by the European Union with a goal is to revolutionize biotechnology by developing comprehensive computational modules that simulate the microbial behavior of bioproducts and quantify/estimate their resource dependencies across various scales. This PhD position is part of a unique multidisciplinary Doctoral Network (15 partners and 10 countries) that will collaborate and train 13 PhDs in genomics, metabolomics, fermentation, process optimization, data science, and sustainability assessments. This project has received funding from the Horizon Europe, Marie Sklodowska-Curie Actions (MSCA) grant (Grant agreement ID: 101227645, https://doi.org/10.3030/101227645).

Supervisors team

The **Dynamics Biodesign Lab (DBDL)**, led by Dr. **Pablo Carbonell**, *creates innovative solutions for automated biofoundries, fostering sustainable industrial biotechnology across the bioeconomy sectors. The lab combines synthetic biology, machine learning, and biosensor and pathway dynamic regulation design to produce next-generation bio-based chemicals.*

The **Computational Synthetic Biology group (CSBG)**, led by Dr. **Irene Otero-Muras**, *works on the design, analysis and control of biomolecular networks: nonlinear, complex systems – sometimes subject to significant molecular noise- with relevance in cell regulation, signaling and metabolic processes. The research aims to advance fundamental understanding and address innovative applications for systems and synthetic biology*.

The **Biotechnology of Industrial Yeasts Laboratory** of I2SysBio, led by Dr. **Agustín Aranda**, *deals with the use of different species of yeast of biotechnological interest, mainly Saccharomyces cerevisiae during winemaking. We are focused in regulatory systems as stress response (mainly oxidative) and nutrient signaling pathways, and we use genetic manipulation to characterize such mechanisms in conditions that mimic industrial environments*.

Host institution description

The **Spanish National Research Council (CSIC)** is the largest public research organisation in Spain and one of the most important in the European Research Area (ERA). It is the main player in the Spanish Science, Technology, and Innovation System and is currently made up of over 13,200 people. These individuals are distributed between the CSIC Corporate Organization, 121 research institutes, and three national centres located throughout Spain, as well as an institute in Rome. The CSIC conducts research in three core areas: Society, Life, and Material, which cover most academic disciplines. In March 2021, the CSIC was among the institutions awarded the 'HR Excellence in Research Award'. The DC will be enrolled in the “Institute for Integrative Systems Biology . The DC will be enrolled in the Science and Technology Programme, Biosciences area, offered by the Menendez Pelayo International University.

Enrolment in Doctoral degree:

Menendez Pelayo International University, https://www.uimp.es/en

Eligibility criteria

- Any nationality
- Doctoral Candidate (DC): The applicant must not have been awarded a doctoral degree.
- Mobility rule: The DC must not have resided or carried out main activity (work, studies, etc.) in the country of their host organisation for more than 12 months* in the three years immediately prior to the date of selection in the same appointing international organisation.
* EXCLUDED: short stays such as holidays, compulsory national services such as mandatory military service and procedures for obtaining refugee status under the General Convention.
- Language: Applicants must demonstrate fluent reading, writing and speaking abilities in English (B2).

We offer

- A comprehensive, interactive and international training programme covering the broader aspects and interface between life science, data science, artificial intelligence and humanities and social sciences, as well as transferable skills
- An enthusiastic team of professionals to co-operate with
- Personal Career Development Plan (PDCP) to prepare young researchers for their future careers
- Each DC will undergo individual training at individual institutes according to the PCDP description
- An attractive compensation package in accordance with the MSCA-DN programme regulations for doctoral candidates. The exact salary will be confirmed and will be based on a living allowance of 3400€/month (correction factor to be applied per country) + mobility allowance of 600€/month. Additionally, researchers may also qualify for a family allowance of 660€/month, depending on the family situation. Taxation and social (including pension) contribution deductions based on national and company regulations will apply.