

FAIROmics

FAIRification of multi-Omics data to link databases and create knowledge graphs for plant-based fermented foods
MSCA-DN-2022 Joint-Doctorates

Apply for your PhD in the FAIROmics project - FAIRification of multiOmics data to link databases and create knowledge graphs for fermented foods.



CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA



AgroParisTech

Job description

Title: DC7, PhD fellowship in identifying and controlling of key regulatory mechanisms for differential responses and metabolic shifts in microorganism populations.

Researcher profile: Doctoral candidate.

Research field: (bio)process modelling, (bio)process control, systems biology.

Type of contract: Temporary.

Job status: Full-time.

Duration: 36 months.

Application deadline: 15/05/2024 23:59 - Europe/Brussels.

Envisaged job starting date: October 2024.

How to apply: submit your application form through this [link](#).

Hiring organisation and offer posting contact details:

Organisation: CSIC - Insititute for Integrative Systems Biology (I²SysBio).

Number of positions available: 1

Country: Spain.

Address: Carrer del Catedràtic Agustín Escardino Benlloch, 46980 Paterna, Valencia.

Please note that this PhD position will lead to the award of a **double diploma** after the completion of a stay in each of these organisations: The **CSIC - Insititute for Integrative Systems Biology** (I²SysBio), Spain and the **University of Paris-Saclay** (UPSaclay), France.

Offer description

In brief:

We are looking for one Doctoral Candidate (DC) to join our project at multiple sites in the EU with a master's degree in a relevant discipline (Master's degree in engineering, physics, systems biology, applied mathematics, biotechnology) interested in Modeling, analysis and control of biological systems in the context of microbial fermentations.

FAIROmics project:

The FAIROmics project has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant agreement N°101120449.

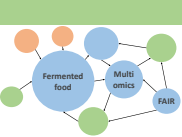
Copyright and legal notice:

"Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them".

"DCR (University of Reading) is funded by the UK Research and Innovation".



Funded by
the European Union



FAIROmics

FAIRification of multi-Omics data to link databases and create knowledge graphs for plant-based fermented foods
MSCA-DN-2022 Joint-Doctorates

The FAIROmics initiative, an interdisciplinary research programme, will gather universities, research centres and private companies to enable the FAIRification of omics data and databases interoperability and develop knowledge graphs for data-driven decision-making to rationally design microbial communities for imparting desirable characteristics to plant-based fermented foods in the context of open science and its regulations. The FAIROmics training programme aims to develop doctoral candidates' skills at the interface between artificial intelligence, life sciences, humanities, and social sciences.

Scientific context:

Plant-based dairy and meat alternatives have grown in popularity in recent years for various reasons, including sustainability and health benefits, as well as lifestyle trends and dietary restrictions. However, plant-based food products can be nutritionally unbalanced, and their flavour profiles may limit their acceptance by consumers. Microorganisms have been used in making food products for millennia. However, the diversity of microbial communities driving plant-based fermentations, as well as their key genetic and phenotypic traits and potential synergies among community members, remain poorly characterised. Many data exist, but they are spread into different literature (scientific and grey) or, in the best case, in different databases. However, they are not always reusable because they are difficult to find and access and because databases are not systematically interoperable.

Objectives:

Elucidating key genes, enzymes and proteins responsible for differential metabolic and cellular responses using model-based analysis techniques:

- Identifying the key regulators and most suitable variables for control of the fermentation/ripening process.
- Conceptualisation and formulation of the control problems to be addressed in order to drive the microorganism population to a desired state in order to meet the a priori desired product-specific control and optimisation objectives (including the control of key metabolic shifts) in the presence of uncertainty and molecular noise.
- Developing methods and software tools for the control and optimisation of gene regulation and metabolism of microorganism populations during the fermentation/ripening process.

Expected results:

- List of the identified key regulators and variables for control of the microorganism population.

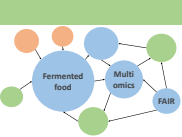
The FAIROmics project has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant agreement N°101120449.

Copyright and legal notice:

"Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them".

"DCR (University of Reading) is funded by the UK Research and Innovation".





FAIROmics

FAIRification of multi-Omics data to link databases and create knowledge graphs for plant-based fermented foods
MSCA-DN-2022 Joint-Doctorates

- Definition of the control problems to be addressed in order to drive the microorganism population to a desired state.
- Methods and tools for model-based feedback control of the microbial population under molecular noise.

Location and planned secondment:

The PhD student will mainly be located at the CSIC - Institute for Integrative Systems Biology (I²SysBio) site in Valencia for **20 months**. A secondment at the UMR SayFood - INRAE/AgroParisTech is also planned for a duration of **16 months**.

Enrolment in Doctoral degree:

1st-degree awarding organisation: Universitat Politècnica de València <https://www.upv.es/index-en.html>

2nd-degree awarding organisation: Université Paris-Saclay <https://www.universite-paris-saclay.fr/en>

Required skills/qualifications:

- Master's degree in engineering, physics, systems biology, applied mathematics or biology with a strong theoretical/computational component, not later than 30 Sept 2024. You should NOT have any kind of PhD degree. Previous research experience (which must be no longer than four years) although appreciated, is not mandatory.
- Educational background and previous research experience relevant to the chosen position.
- Good numerical/computational skills.
- Ability to communicate with different disciplines (from experimental biology to computational and theoretical mathematics).
- Networking and good communication skills (writing and presentation skills).
- Willingness to travel abroad for the purpose of research, training and dissemination.

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.

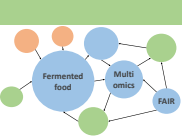
The FAIROmics project has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant agreement N°101120449.

Copyright and legal notice:

"Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them".

"DCR (University of Reading) is funded by the UK Research and Innovation".





FAIROmics

FAIRification of multi-Omics data to link databases and create knowledge graphs for plant-based fermented foods
MSCA-DN-2022 Joint-Doctorates

- **Language:** Applicants must demonstrate fluent reading, writing and speaking abilities in English (B2).

Supervisors team

The supervisor team is composed of **Irene Otero-Muras** (I2SysBio), **Cristian Trelea** and **Emmanuel Bernuau** (AgroParisTech). The PhD candidate will benefit from the research experience in dynamic modelling and automatic control in CSIC-I2SysBio and APT. Both partners develop complementary tools for model analysis, parameter identification, and multi-objective dynamic optimisation and have extensive experience with theory and applications of automatic control to biological processes. Specifically, at CSIC-I2SysBio, the DC will benefit from the expertise in advanced mathematical analysis and control of biomolecular systems (including regulation, signalling and metabolism), whereas at APT, the DC will develop theoretical and computational tools for dynamic system control during fermentation/ripening processes.

Host institutions description

Institute for Integrative Systems Biology: The **Spanish National Research Council** (CSIC-Agencia Estatal Consejo Superior de Investigaciones Científicas) <https://www.csic.es/en/csic> is an autonomous, multi-disciplinary public research body affiliated to the Spanish Ministry of Science and Innovation. The CSIC has its own legal structure and is represented throughout the Spanish territory with a total of 105 centres/institutes. CSIC is the first Spanish organisation in the Framework Program of the European Union by number of projects and economic return. The I²SysBio <https://www.uv.es/i2sysbio> is a joint research institute involving Universitat de València (UV) and CSIC. I²SysBio Scientific Programs focus on research into the structure, function, dynamics, evolution, and manipulation of complex biological systems.

AgroParisTech is a school of engineering in the field of life sciences <https://www.agroparistech.fr/en>, part of the **Paris-Saclay University**. The DC will be hosted at the Paris-Saclay Food and Bioproduct Engineering Research Unit (SayFood). This lab's research interests are physical, biochemical and microbiological processes that govern the food and non-food transformations of bioproducts. SayFood is a joint research unit between AgroParisTech and INRAE national research institute on agriculture, food and environment <https://www.inrae.fr/en>.

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.

The FAIROmics project has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant agreement N°101120449.

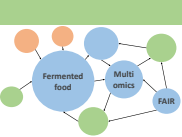
Copyright and legal notice:

"Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them".

"DCR (University of Reading) is funded by the UK Research and Innovation".



Funded by
the European Union



FAIROmics

FAIRification of multi-Omics data to link databases and create knowledge graphs for plant-based fermented foods
MSCA-DN-2022 Joint-Doctorates

- An enthusiastic team of professionals to co-operate with.
- Personal Career Development Plan (PCDP) 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.

*family = be married/be in a relationship with equivalent status to a marriage recognised by the legislation of the country or region where it was formalised/have dependent children who are being maintained by the researcher.

Selection process

The selection process is based on the merits of providing equal opportunity and will be in agreement with the [European Code of Conduct for the Recruitment of Researchers](#).

1. **Candidates** apply for a position using the **online application form** ([accessible here](#)).
2. The **FAIROmics Project Manager provides a first screen** of the written applications to **check the eligibility** of the candidate and forwards the eligible applications to the DC supervisors.
3. The **DC supervisors** will select the **best candidates based on CV, academic records, recommendation and motivation letters and adequate skill set**. To better assess the best candidate, the shortlisted candidates might be asked to write an abstract of provided scientific documents relevant to the research subject.
4. The selected applicants will be **interviewed through an online meeting by the Selection Committee** (two main supervisors and two representatives of a beneficiary or associated partner, with at least one person external to the DC's project).
5. The **best candidates will be chosen by the main supervisors**. The European Project Manager will communicate the successful candidates to the Consortium and Partners.

The FAIROmics project has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie grant agreement N°101120449.

Copyright and legal notice:

"Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them".

"DCR (University of Reading) is funded by the UK Research and Innovation".

