

Title : 3 PhD positions available - Marie Skłodowska-Curie Actions (MSCA-ITN) "E-MUSE" Complex microbial Ecosystems MultiScale modelling: mechanistic and data driven approaches integration

Researcher Profiles: First Stage Researcher

Type of Contract: Temporary

Job Status: Full time (based on COVID-19 evolution and restrictions, possibility to start remotely, once situation allows the presence is required)

Application Deadline 01/04/2021 00:00 - Europe/Brussels

Envisaged Job Starting Date: 01/10/2021

How to apply: E-MUSE website: <https://www.itn-emuse.com/>

Hiring Organisation & Offer Posting Contact Details

Organisation: INRAE (French National Research Institute for Agriculture Food and Environment); AgroParisTech - Centre de Grignon

Number of Positions Available: 3 (ESR5, ESR10, ESR15)

Country: France

Address : Avenue Lucien Brétignières, THIVERVAL GRIGNON, F-78850

Offer Description

We are looking for 3 Early Stage Researchers (ESRs) to join our project at multiple sites in EU with a master degree in a relevant discipline (chemical engineering / food process engineering / microbiology / bioinformatics / mathematical / computational / data / applied physics sciences) interested to develop innovative modelling techniques aiming to reconstruct the dynamics of complex multiscale biological systems.

The E-MUSE training programme aims at developing young researchers' skills at the interface between artificial intelligence and life sciences. The challenge is to acquire a shared language bridging life science questions and original modelling approaches. The research programme of the E-MUSE network is to develop innovative modelling methodologies to understand a complex microbial ecosystem and identify levers to control and/or predict its evolution. To deal with biological complexity, biologists, mathematicians, and computer scientists have to work together to develop innovative methodologies. An important complexity of this domain originates from scales and dynamics issues, ranging from local kinetics at the level of the cell to emerging macroscopic properties of the biological system. The development of high throughput techniques provides more and more large datasets, but knowledge is not easily inferred from this huge amount of data and multiscale dynamics are still incompletely characterised and predicted. E-MUSE's transdisciplinary network gathers academic and industrial partners to equip Early Stage Researchers (ESRs) with scientific, research and transferable skills to become leaders in academic research or industry. They will be at the cutting edge of the modelling methodologies that we apply to model structural and dynamic features of microbial communities, to identify key processes and biomarkers for specific applications.



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ESR5

Objectives: The objectives of the ESR project are (1) to study the effect of iron on growth and metabolism of ripening microorganisms, a predictive growth model will be done to better anticipate complex ecosystem understanding; (2) to analyse the metabolome of key microorganisms alone, and in consortia in controlled condition; (3) to constrain a genome-scale metabolic model in collaboration with ESR1 (VUA) (www.itn-emuse.com/wp).

Required Skills/Qualifications:

- chemistry and biochemistry skills
- LC-MS and GC-MS experience (Appreciated)
- bioinformatics skills, statistics (Appreciated)

ESR10

Objectives: The objective of the ESR10 project is to understand the effect of iron on the cheese ecosystem. Dynamic data will be collected during the ripening process of a model cheese produced with/without iron supplementation. Several macro-scale data will be collected. The deduced macroscopic properties will be used by the modelling researchers to identify relationships with micro-scale features from multi-omics data collected in parallel. The ESR will be trained to analyse and integrate these data to identify biomarkers of the evolution of the microbial community overtime (www.itn-emuse.com/wp).

Required Skills/Qualifications:

- previous experience in omics data manipulation
- bioinformatics skills, statistics (Appreciated)

ESR 15

Objectives: The objective is to develop dynamic models for the evolution of selected use properties of cheese during the ripening process. Use properties include sensory evaluations of cheese attributes expected by consumers, and technological properties desired by the cheese-making companies. Relations with microbiological, physical and chemical models developed in other ESRs' projects will be established (www.itn-emuse.com/wp).

Required Skills/Qualifications:

- good programming and data processing skills
- previous experience in dynamic modelling of (bio)chemical phenomena would be a plus

Specific Requirements for all ESRs

- educational background and previous research experience relevant for the chosen position
- networking and communication skills in a multicultural and multidisciplinary environment
- willingness to travel abroad for the purpose of research, training and dissemination
- English: B2, good oral and written communication skills in English are compulsory



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We offer

- A comprehensive, interactive and international training programme covering the broader aspects and interface between biology, bioinformatics, statistics, systems biology, predictive microbiology and artificial intelligence as well as transferable skills.
- An enthusiastic team of professionals to co-operate with.
- Personal Career development plan (PCDP) to prepare young researchers for their future careers.
- Each ESR will undergo individual training at individual institutes according to the PCDP description.
- An attractive compensation package in accordance with the MSCA-ITN programme regulations for early stage researchers. Exact salary will be confirmed upon and will be based on a Living Allowance of €3270/month (correction factor to be applied per country) + mobility allowance of €600/month. Additionally researchers may also qualify for a family allowance* of €250/month depending on family situation. Taxation and Social (including Pension) Contribution deductions based on National and company regulations will apply.
- Duration of recruitment: 36 months.
*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.



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Eligibility criteria

- **Any nationality**
- **Early Stage Researchers (ESR)**

The applicant needs to be in the first four years of their research careers at the date of recruitment by the host organisation, and have not been awarded a doctoral degree. The first four years are measured from the date of applicant's degree either in the country in which the degree was obtained or in the country in which the researcher is recruited, irrespective of whether doctorate was ever envisaged.
- **Mobility Rule**

The ESR must have not resided or carried out main activity (work, studies, etc.) in the country of their host organisation \leq 12 months* in the 3 years immediately prior to their recruitment. Exceptions: The ESR must not have spent more than 12 months in the 3 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 Geneva Convention
- **Language**

Applicants must demonstrate fluent reading, writing and speaking abilities in English.

Selection process

1. **Candidates** apply for a position using the **online application form at E-MUSE website**.
2. The **E-MUSE Project Manager provides a first screen** of the written applications to **check eligibility of the candidate** and forwards the eligible applications to the ESR supervisors.
3. The **Selection Committee(s) (consists of researchers per WP)** will select the **best candidates based on CV, academic records, recommendation and motivation letters and adequate skills 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 ESR supervisors**.
5. If possible, **personal interviews** will be held with the **presentation of a master thesis** by shortlisted candidates. Expenses made by the candidate for travelling and the hotel will be reimbursed by the local organisation. **Due to Covid-19, this stage can be done via an online meeting**.
6. The **best candidates will be chosen by the ESR supervisors and the Selection Committee(s)**. European Project Manager will communicate the successful candidates to the Consortium and Partners.



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