Job Title	**DC position in Bio-GENTLE Doctoral Network**
Individual Project Title	**DC9 – 'Design of membrane chromatography units and their implementation in bioprocessing'**
Host Institution	Alma Mater Studiorum - Università di Bologna
Department	Department of Civil, Chemical, Environmental, and Materials Engineering (DICAM)
Unibo Scientist in charge for Bio-GENTLE	Professor Cristiana Boi
Reporting to	Professor Cristiana Boi (Supervisor) Professor Marco Giacinti Baschetti (co-Supervisor)
Duration	36 months (Full Time)
Annual Salary (includes Living and Mobility Allowances plus Family Allowance if eligible):	gross amount in compliance with the rules of the Horizon Europe programme for DN-MSCA, as foreseen in the MSCA Work Programme 2021-22 (taxes depend on the country of the host institution): 39.739€ (country-specific correction coefficient-IT applied) + 7.200€ (+ 7.920€ if eligible).
Deadline for applications:	**July 16th, 2024**
Expected starting date:	**November 1st, 2024**

Details Specific to the Position DC9

The Bio-GENTLE Doctoral Network is looking for
12 researchers to work on the EU-funded Doctoral Network 'Bio-GENTLE: Green membrane bioseparation for circular economy'.

The project **Bio-GENTLE** led by the University of Twente (project coordinator), has been awarded an EU grant of €2.679.321,60 under the **Horizon Europe Marie Skłodowska-Curie Doctoral Network** for recruiting, employing and providing advanced training for 12 Doctoral Candidates (DCs) with an overarching goal to propel Europe to the forefront of research and development of biomolecules that can be used as high-volume commodities or low-volume, but high-value compounds in food, pharmaceutical, and cosmetic industries. The scientific aim of this network will be to produce and share knowledge, insights, and solutions to these objectives, thereby enabling major steps towards, and providing evidence of sustainable biomaterials production on larger scales for application in food, pharmaceutical, and cosmetics in Europe.

The Doctoral Candidates (DC) to be recruited will be employed to conduct research and complete PhD training across Europe in conjunction with our academic and non-academic consortium partners:

- Universiteit Twente (Netherlands) – Project coordinator
- **Alma Mater Studiorum-Università di Bologna (Italy)**
- Forschungs-zentrum Jülich GmbH (Germany)
- Katholieke Universiteit Leuven (Belgium)
- University of Paul Sabatier TOULOUSE III (France)
- NX FILTRATION BV (Netherlands)
- University of Lancaster (United Kingdom)

The **University of Bologna (Italy)** is recruiting one of these 12 to research and write a PhD thesis on **'Design of membrane chromatography units and their implementation in bioprocessing'**. We welcome applications from candidates with a degree giving access to doctoral studies, a demonstrable interest and experience in membrane separation, English language skills, and a willingness to spend a period of up to 12 months in secondments (6 months at Forschungs-zentrum Jülich GmbH, Germany). Applicants will be required to submit a research proposal (maximum 1000 words) outlining the innovative ways in which they will tackle this project (further details below).

Job description (DC9)

The successful candidate for this post (DC9) will be employed full-time for a fixed-term of 36 months and enrolled on a PhD at the University of Bologna from 1st November 2024 to research and write a PhD thesis on *'Design of membrane chromatography units and their implementation in bioprocessing'* within Work Package 3 "Maximising process throughput and precision via design of separation units/systems (S/T)".

Job duration: 36 months

Main research field: membrane chromatography

Research subfield: process chromatography, bioprocessing, mathematical modelling

Project description (DC9)

The project will focus on the development of novel units for membrane chromatography. Packed column chromatography is one of the main separation processes in the purification of biomolecules, and membrane chromatography is an emerging technology that shows great promise. However, there are still challenges with the implementation of membrane chromatography in industrial bioprocesses, mainly due to the lack of suitable equipment that can provide reliable performance at different scales. As with conventional packed columns, uniform mobile phase distribution and reduced residence time distribution within the stationary phase are essential to ensure efficiency and resolution in membrane processes. From this perspective, the geometry and architecture of the module play a critical role. Membrane modules can be classified according to the flow path within the bed: axial flow or radial flow. Regardless of the flow path, membrane chromatography modules are characterized by a bed with a high surface area to length ratio, uneven residence time distribution and a high dead volume fraction. These parameters and their effects on the process performance vary significantly with the module size and cannot be accurately predicted based on experimental results obtained on small modules. As the module size increases, the uniformity of fluid distribution deteriorates, the residence time distribution increases, and the ratio of dead volume to membrane volume alters.

Institution description and working place:

The University of Bologna is one of the largest and most active Italian universities in research and technology transfer in Italy. It stands among the most important institutions of higher education in EU with 96.984 enrolled students in 2022/23, 8.526 of which are International Students; At UNIBO, research activities are promoted, coordinated and supported by the 32 Scientific Departments.

The successful applicant will be based in the **Department of Civil, Chemical, Environmental, and Materials Engineering (DICAM)**, which is responsible for Undergraduate and Postgraduate degree programmes in Chemical and Biochemical

Engineering and Chemical and Process Engineering. Bologna's. DICAM Department hosts various Research Centres and 12 laboratories that operate in all specific areas of Civil, Chemical, Environmental and Materials Engineering. The membrane group is part of the Chemical and Process Engineering Research Laboratory (LABIC) and for over forty years it has been conducting research and experimentation in diffusion in polymers and membrane separation processes.
Traditional and cutting-edge equipment is used to develop, analyse and characterise materials, membranes, develop purification processes at the laboratory and pilot scale It is moreover an authorized agency for standards testing and certification for third parties.
DICAM offers a wide range of PhD programmes, among which the PhD in Civil, Chemical, Environmental, and Materials Engineering with the curriculum in Chemical and Process Engineering which will host the researcher during their doctoral training. DICAM staff can share consolidated expertise in the coordination of trans-disciplinary research projects and other European projects together with excellent competences in chemical and process engineering, biotechnology, membrane technology, polymer science, membrane processes, separation processes, process chromatography, bioseparations.
The project will take place at the LABIC Laboratory of the University of Bologna. The DC will have access to all the lab facilities and services as well as to the local Department administrative offices. A secondment is scheduled for 6 months at Forschungs-zentrum Jülich GmbH, Germany).

Specific Duties and Responsibilities of the post
Doctoral candidates do research while being guided by supervisors and at the same time fulfill a PhD training program. The goal is to complete the doctoral education and to obtain the doctoral degree.

They will be required to:

- Attend the project-wide training program with the other DCs candidates and all other project events including the Bio-GENTLE final workshop.
- Contribute to the final project report in the "Design of membrane chromatography units and their implementation in bioprocessing".
  Successfully complete and submit a PhD thesis before the project ends.

Candidate profile
The candidate is required to have obtained a degree giving access to the PhD school by July 31st, 2024 and NOT to hold any PhD degree, preference will be given to degrees in in Chemical and Process Engineering. Previous research experience membrane science and engineering, process chromatography and mathematical modelling, although appreciated, is not mandatory. Good communication skills in English are compulsory. Willingness to travel internationally for the purpose of research, training and dissemination is mandatory.

Eligibility requirements
There are strict eligibility rules for the recruitment of Doctoral Candidates in Horizon Europe Marie Skłodowska-Curie Doctoral Network funded projects.

Career: applicants must be doctoral candidates at the time of recruitment. They must have obtained a degree which formally entitle them to access a doctorate and they must not have been awarded a doctoral degree. A PhD degree in any field is not compatible with this DC position. Candidates who have successfully defended their doctoral thesis but who have not yet formally been awarded the doctoral degree will not be considered eligible.

Mobility: Transnational mobility is an essential requirement of Marie Skłodwska-Curie Doctoral Networks. The DC may be of any nationality and any age, but must not have resided or carried out their main activity (work, studies, etc.) in Italy for more than 12 months in the 3 years immediately before the recruitment date (expected on 1st November 2024).

Applicants must be prepared to undertake transnational mobility of up to 12 months of secondment (for DC9, the planned secondment is of 6 months at Forschungs-zentrum Jülich GmbH, Germany).

Language: A good knowledge of spoken and written English is required and will be evaluated during the selection process.

Preferred selection criteria

- A degree obtained by July 31st, 2024 giving access to doctoral studies in in Chemical and Process Engineering and experience membrane science and engineering, process chromatography and mathematical modelling.
- Laboratory experience.
- Good understanding of transport phenomena.

Personal characteristics

- Analytic
- Curious
- Problem solver

Emphasis will be placed on personal and interpersonal qualities.

How to apply

The applicant should provide the following documentation (please see and complete the 'Application Form'):

- The application form duly completed.
- A Curriculum vitae including previous scientific experiences with a complete list of publications (if any) and/or participation to scientific meetings.
- A letter of motivation, including research interests, reasons for applying for this programme etc.
- Dedication to specific DC (from Letter of Motivation and Project);
- Copy of university diplomas and study certificates (including the Transcripts of records, grades and university courses).
- The applicant must also provide the name and contacts of 2 referees (at least 1 academic: employer, supervisor, etc.) with reference letters in English.
- English Language Certificates (if available).
- A research proposal (maximum 1000 words articulated as follows: state of the art; goals; methodology; expected results; implementation times; references) outlining the innovative ways in which they will design the research project DC6.

The documents must be sent by e-mail to: dicam.biogentle-unibo@unibo.it

Evaluation and interview

In assessing which candidate is best qualified, emphasis will be placed on education,

experience and personal and interpersonal qualities. Motivation, ambition, and potential will also be considered when assessing candidates. The selection process will consist of several steps. After checking that the candidates meet all eligibility requirements, only the CVs, motivation and track records of those who are eligible will be evaluated.
Candidates matching the required profile will be interviewed - mainly online - to assess their skills, the motivation and the fluency in English (additional interviews may be required). Following the interview, some applications may be rejected.

The remaining candidates will be ranked on the basis of both their documentation and the interview. The highest ranked candidate will be offered the position. If, for any reason, the selected candidate declines the offer or fails to meet the enrolment requirements for the position, the next candidate on the list will be selected.
More details on the selection process could be found on https://www.bio-gentle.eu

Rights and responsibilities of researchers participating in Marie Skłodwska-Curie Actions

The European Charter for Researchers is a set of general principles and requirements which specifies the roles, responsibilities and entitlements of both researchers and the employers and/or funders of researchers. The aim of the Charter is to ensure that the nature of the relationship between researchers and employers or funders is conducive to successful performance in generating, transferring, sharing and disseminating knowledge and technological development and to the career development of the researchers.
It is obligatory for applicants to read and understand the detailed information regarding the rights and responsibilities of researchers engaged in a Marie Skłodwska-Curie Doctoral Network. The European Charter for researchers can be accessed at:
https://euraxess.ec.europa.eu/jobs/charter/european-charter

Employment contract and remuneration

The selected candidate will be appointed under a 36-months full-time employment contract with full social security and fiscal coverage, as foreseen by the Italian national legislation. The remuneration will be compliant with the rules of the DN-MSCA, as by the Horizon Europe Marie Skłodowska-Curie Actions Work Programme 2021-22, “Applicable unit contributions”. The gross amount per year of the salary includes the living allowance (39.739€ comprising the country-specific correction coefficient for Italy), the mobility allowance (7.200€) and the family allowance if eligible (7.920€). These gross amounts include all compulsory deductions under national applicable legislation (taxes depend on the country of the host institution).