

PhD student position

Biomolecule aggregation and crystallization in controlled flow regimes in microfluidic devices

Inter-departmental: Bioengineering Sciences, Chemical Engineering

Location: Vrije Universiteit Brussel

Application Deadline: 31 January 2025

About Us: At the VUB, we are at the forefront of groundbreaking research, pushing the boundaries of knowledge and innovation. We pride ourselves on fostering a dynamic and collaborative environment where passionate individuals can thrive and contribute to meaningful discoveries. We are currently seeking a motivated and talented individual to join our team as a PhD student.

Project Description:

The aging population and consequent increase in chronic and life-threatening diseases have significantly contributed to the rising demand for biopharmaceuticals, i.e. biomolecules such as proteins, monoclonal antibodies and nucleic acids.

Crystallization is a sustainable, cost-efficient and scalable separation, purification and formulation technique that overcomes the current challenges of chromatographic steps and liquid formulation in pharmaceutical industry.

This exciting opportunity involves research at the intersection of microfluidics and crystallization research. Your project aims at assessing the influence of different flow/mixing regimes on the nucleation of biomolecules crystals and biomolecules aggregates.

A range of flow and mixing configurations will be conceived and characterized by particle image velocimetry. Next, crystallization conditions will be steered in function of specific crystal polymorphs, sizes and morphology preventing aggregation. A scattering based optical analysis method of the formed solids will be applied and interpreted.

This PhD project (doctoral candidate nr. 4) is part of the Horizon MSCA-DN project 'Procrystal', in which 13 PhD students collaborate on crystallization of biomolecules. For DC4 a 4 month research stay is planned at the CSIC lab of Dr. José Gavira (Granada, Spain), next to a 3 month research stay at the EOS lab of Dr. Tiziano Sanvito (Milano, Italy). The remaining period (in total 4y PhD project) will be spent in Brussels at VUB under the promotorship of Profs. Maes and De Malsche.

Responsibilities:

- Design and microfabricate (in the MICROLAB cleanroom at VUB) microfluidic flow devices for mixing and solidification
- Operate advanced setups (pumps, cameras, optical characterization of solids) to screen crystallization conditions
- Develop a flow methodology targeting a specific polymorph and the required size distribution and morphology of the emerging crystal phase preventing the nucleation of aggregates
- Implement an analytical optical method to classify the nucleated phase

- Conduct research experiments and data analysis within the designated research area
- Collaborate with interdisciplinary teams to advance research objectives and contribute to scientific publications
- Present research findings at conferences and seminars

Qualifications:

- Master's degree (or equivalent) in relevant field, e.g., Bioengineering, Physics, Chemical Engineering, Biotechnology, Biology.
- Excellent communication in English and interpersonal skills
- Ability to work independently and as part of a team
- Prior research experience (thesis or student project) in related areas is advantageous

Mobility Rule: researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary (Belgium for this vacancy) for more than 12 months in the 36 months immediately before their date of recruitment. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention¹ are not taken into account. For international European research organisations², international organisations, or entities created under Union law, recruited researchers must not have spent more than 12 months in the 36 months immediately before their date of recruitment in the same appointing organisation.

Benefits:

- Competitive stipend and benefits package
- Access to cutting-edge research facilities and resources
- Opportunities for professional development and networking
- Initial one-on-one supervision by a more senior scientist
- Collaborative and supportive research environment
- Guidance in fellowship applications
- Wide training in science, soft skills and (societal and economic) valorization

How to Apply: Interested candidates are invited to submit a CV, a cover letter outlining their research interests and relevant experience, academic transcripts, and contact information for at least two references. Please email your application to dominique.maes@vub.be and wim.de.malsche@vub.be with the subject line: "PhD Student Application: Biomolecule aggregation and crystallization in microfluidic devices", and join us in making groundbreaking discoveries and shaping the future of scientific research! We look forward to welcoming you to our team at the VUB.