# Post-Doctoral Fellowship position

## "ChipOmics" project (SPW Walloon Region win2wal, 2.2M€ grant)

## Microfluidic-based sample preparation for single-cell proteomics

A 4-year position for a PostDoc fellowship is available at the MSLab Omics @University of Liège, Belgium (Gabriel Mazzucchelli, project coordinator, MSLab Director Gauthier Eppe). It is open in the framework of the 4-year research project ChipOmics funded by the Walloon Region, in partnership with the Microfluidics Lab @ ULiège (Tristan Gilet), the GIGA Stem Cells group @ ULiège (Laurent Nguyen), the research center Sirris and the epigenetics company Diagenode.

In vitro models of human organs and tissues can be built through the differentiation of human-induced pluripotent stem cells. These models are key to the development of cell therapy, cancer science, immunology and personalized medicine. Each cell contains a unique proteome that defines its functional state and that evolves over time. It can be determined thanks to mass spectrometry. In order to understand and control the differentiation process, we need to access this proteome for each cell separately. Single-cell proteomics is much more challenging than single-cell genomics or transcriptomics, owing to the impossibility to amplify the tiny amount of proteins in each cell. A promising solution to proteomics at the single-cell level would be to downscale the sample preparation steps. It would minimize the loss of biological material and increase the yield of chemical and enzymatic reactions. The ChipOmics project aims at developing a disposable microfluidic chip that can robustly perform sample preparation workflows for quantitative single cell proteomics. The main specificity of this chip is that it will only be interfaced with standard lab instruments. The liquid samples and reagents will flow therein in response to controlled centrifugal and capillary forces.

In this project, the PostDoc is asked to design the proteomic applications to be used with the microfluidic chip, to establish the sample preparation workflows and the functionalities needed for every step. The protocols will be first validated at a micro volume scale before to be implemented into the chip.
The development is an iterative process through the generation of intermediate demonstrators with increased complexity workflows. During this process the Postdoc will test and optimize the protocols, use the chip for different application tests and finally proceed with the final biological study on the differentiation of human-induced pluripotent stem cells to identify fundamental mechanisms that regulate cerebral neurogenesis.

The PostDoc will have to interact constantly with all the partners of this multidisciplinary project.

**Expected candidate profile**

• PhD in life sciences, chemistry, biochemistry or related field

• Required knowledge:
- 3+ years of research experience in mass spectrometry-based proteomics
- Solid hands-on expertise in sample preparation to data processing including both label-based and label-free approaches
- Excellent knowledge in mass spectrometry and nano-flow liquid phase chromatography

• Appreciated knowledge:
  - Single-cell proteomic analysis
  - Ion Mobility mass spectrometry (Tims-ToF Pro, Bruker)
  - Acquity nano or M-Class UPLC systems (Waters)
  - Orbitrap mass spectrometer
  - Extended bioinformatic skills applied to mass spectrometry data processing (Maxquant, Peaks, Protein Scape, Proteome Discoverer, Perseus).
  - Statistics applied to proteomics
  - Microfluidics
  - Fluorescence-activated cell sorting (FACS)
  - Laser Microdissection
  - Physics

• Required skills:

  - Participate to projects in collaboration with an interdisciplinary team
  - English (fluent)
  - Strong communication skills, communicate results through articles, reports and talks
  - Scientific rigor
  - Team work

• Appreciated skills:

  - Quality management
  - Interest in experimental research, mechanical design and physical modeling
  - Excellent organizational skills, prioritization of the work

The PostDoc will work at the MSLab (ULiège) under the supervision of Gabriel Mazzucchelli, in close collaboration with the MSLab team and all the project partners.
The PostDoc will have the chance to have access to the exceptional equipment of the MSlab and to interact with laboratories and technological platforms from the GIGA @ULiège.
The PostDoct will be employed for maximum four years, with a yearly evaluation.
Interested people should email the following documents to Gabriel Mazzucchelli before December 31, 2020: cover letter, resume, transcript of grades & ranking and any other document that may be useful to support the application (e.g. publications, master's and PhD's thesis, project reports). They should also provide the name, affiliation, email address and phone number of two professors (including the PhD's thesis advisor) who will be asked to provide recommendation. Finally, non-EU applicants have to join a European equivalent of their PhD's diploma. Short-listed applicants will be invited to a videoconference interview in early January 2021. The interview will include a short test on the required knowledge and skills listed above. The appointment should start between February 1 and March 31, 2021.

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