

Title of the thesis	Leveraging multi-omics data to implement a Transcription Factor Classifier
Acronym	TFClass
Reference number	014

Hosting institution	Employer
Université de Lille <u>Website:</u> https://www.univ-lille.fr/home/	Université de Lille <u>Website:</u> https://www.univ-lille.fr/home/
Hosting research unit 1	Hosting research unit 2
<u>Name:</u> U1011 Nuclear receptors, metabolic and cardiovascular diseases <u>Acronym:</u> U1011 <u>Identification number:</u> U1011 <u>Address:</u> Université de Lille Faculté de Médecine de Lille - Pôle Recherche Boulevard du Professeur Leclerc, Bâtiment J&K 59045 Lille Cedex <u>Website:</u> https://u1011.pasteurlille	<u>Name:</u> Evaluation des technologies de santé et des pratiques médicales <u>Acronym:</u> METRICS <u>Identification number:</u> ULR2694 <u>Address:</u> Inria MODAL Parc scientifique de la Haute Borne 40 avenue Halley, Bat. A 59650 Villeneuve d'Ascq <u>Website:</u> https://team.inria.fr/modal/
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Thesis information	
Keywords	Multi-omics data integration, Transcription factors, Chromatin, Heterogeneous data normalization, Statistical learning
Abstract	<p>Transcription factors (TFs) consist of a very large family of proteins, which are the cornerstone of gene expression regulation. TFs exert their activities within the context of the chromatin, which defines an intrinsic barrier and therefore needs to be "opened" by TFs for efficient gene regulation. TFs present with different abilities to bind and remodel the chromatin. However, experimental designs allowing to directly interrogate TFs molecular activities on chromatin remain impracticable for large-scale studies. Here, we propose to leverage the ever expanding array of "omics" approaches used to analyse TF-mediated gene regulation in the chromatin context to extract information allowing to classify TFs based on their molecular activities on chromatin. The project aims to implement normalization and classification procedures making use of heterogeneous and sparse "omics" data in order to extend and refine our knowledge of the different categories of TFs with regards to their molecular activities on chromatin. In addition, this project will pave the way to subsequent studies aiming to combine analyses of different omics-based approaches by overcoming some of the current limitations in this growing field of biomedical sciences.</p> <p>The candidate PhD student will benefit from a strong pluridisciplinary environment being co-supervised by experts in molecular biology of TFs (J. Eeckhoutte - Inserm U1011 - https://u1011.pasteurlille.fr/lunite/theme-4-analyse-moleculaire-de-la-regulation-des-genes-dans-le-syndromecardiometabolique/) and statistics for omics data (G. Marot - Univ. Lille, CHU Lille ULR2694 – METRICS and Inria MODAL team). Moreover, the project will also involve M. Lupien (Univ. Toronto, Princess Margaret</p>

	<p>Cancer Centre, Canada - M. Lupien - https://www.pmgenomics.ca/lupienlab/), who is an expert in bioinformatics for epigenomics data and who will host the PhD candidate for a secondment.</p> <p>Training of the PhD candidate will be further strengthened by attending international meetings in systems biology and bioinformatics/(bio)statistics.</p>
Expected profile of the candidate	<p>The successful PhD candidate should hold a master in statistics or data science, with options related to biological data including omics data analysis or a master in bioinformatics with a strong component in statistics. He/she must master statistical learning methods, have computer programming skills in R and Python, and knowledges about molecular biology. Proven ability to work within a pluridisciplinary environment would be an asset.</p>
Application procedure & Eligibility criteria	<p>The application procedure and eligibility criteria are detailed on the European doctoral programme PEARL website www.pearl-phd-lille.eu. The funding is managed by the I-SITE ULNE foundation which is a partnership foundation between the University of Lille, Engineering schools, research organisms, the Institut Pasteur de Lille and the University hospital.</p> <p>The application file will have to be submitted before March 31, 2021 (10:00 AM - Paris Time) and emailed to the following address : international@isite-ulne.fr.</p>
Net salary and Lump Sum	<p>A net salary of about €1,600 + €530 per month to cover mobility, travel and family costs.</p>