Job title	**PhD thesis in biophysics (3yrs) + Postdoc (18 months)**
General information	In the course of the ANR project DYPROSOME (**Dynamics of DNA repair proteins at the nucleosome)**, funding period Oct 2021-Sept 2025, we open a PhD position (3 years) and a post-doctoral position (18 months), based in Lille. Starting date for both positions is October 1st, 2022 ; for the post-doc, a later date is conceivable. The project combines computational and experimental studies of the molecular recognition mechanisms by which repair proteins of the base-excision repair pathway (BER) can identify the earliest stages of DNA damage in the nucleosome. It is run by four partners : two teams at the interface of statistical physics and computational biology, based in Lille, and two experimental teams (biochemistry, structural biology) in Grenoble.
Description of the subject	In this research project at the interface between physics and biology, the two successful candidates will develop and build molecular models of nucleosomes carrying damaged DNA sites, and models of the repair proteins (UDG and OGG1 glycosylases) by molecular docking and statistical mechanics, interacting with the curved and twisted DNA as seen in the nucleosome. Molecular dynamics simulations will provide detailed understanding of the microscopic action mechanisms of UDG and OGG1, in the context of a single nucleosome, elucidating the role of histone tails, and of some key histone modifications. A second part of this experimental-theoretical project will be focused on very-large-scale molecular dynamics of 3 to 12 poly-nucleosome arrays also including DNA defects, and the impact of the glycosylases on the local structural rearrangement on such small-scale chromatin subunits.
Work environment	The workplaces are located in two teams at the University of Lille, in the physics department of IEMN and the computational systems biology group at UGSF. The work will be partly shared between the PhD and postdoc, with respectively clear and well-defined objectives, and will be jointly supervised by Drs. Blossey (UGSF) and Cleri (IEMN). The Lille teams interact closely with the experimental teams at the Laboratoire de Biologie et Modélisation de la Cellule, (LBMC CNRS UMR 5239) of Ecole Normale Superieure Lyon; and the Institut pour l'Avancée des Biosciences (CNRS UMR 5309) University Grenoble-Alpes. Personal interactions with the project partners are a key element of the project. **Site (PhD):** Institut d'Electronique Microelectronique et Nanotechnologie (IEMN UMR CNRS 8520), Avenue Poincaré, 59652, Villeneuve d'Ascq, France. **Team:** Physics Division. **Supervision:** Prof. Fabrizio CLERI, fabrizio.cleri@univ-lille.fr Phone: +33.320.19.79.28 The candidate will enroll in the Engineering Doctoral School (ENGSYS), Specialty Micro and Nanotechnology **Site (postdoc):** Unité de Glycobiologie Structurelle et Fonctionnelle (UGSF UMR CNRS 8576), Av. de la Haute Borne, 59652, Villeneuve d'Ascq, France. **Team:** Modelling Group **Supervision:** Dr. Ralf BLOSSEY, ralf.blossey@univ-lille.fr Phone: +33.362.53.17.31
Supplementary information	**PhD candidates** with a Master degree or equivalent in physics, chemistry or biology will be considered. Good attitude to theoretical developments and computer modelling is important. Basic knowledge in biophysics. Programming skills (Fortran, C/C++, Python) constitute a preference title. Working language is English; French is not required however the University program provides free language courses. Candidates must include in their application: a detailed CV; at least two references (people susceptible of being contacted); a motivation letter (one page); a concise summary of your Master internship (one page); grades of your Master courses. **Postdoctoral candidates** with a PhD degree or equivalent in physics, chemistry or biology will be considered. Molecular modelling experience in high-performance computing environment is mandatory; previous work and publication records on DNA, nucleosome, and/or chromatin computer simulations at different scales is a preference title. Candidates must include in their application: a detailed CV; at least two references (people susceptible of being contacted); a concise summary of your PhD thesis; a motivation letter outlining your work experience after the PhD (one page).