# Postdoctoral in nanoscale modeling at LGCgE, University of Lille, France

A postdoctoral position will soon be available in Ali Zaoui's group at LGCgE, University of Lille. Prospective candidates are invited to send a manifestation of interest including a CV and a detailed description of their scientific achievement.

**Title: Sustainable low-carbon materials for urban development and pre-identification of an industrial sector in Hauts de France**

**Details of the project:**

In light of the environmental challenges facing our planet, it is essential to implement ambitious measures in the construction and housing sectors, which account for one-third of total greenhouse gas emissions. Reducing the environmental footprint of industries requires the development of alternative materials to partially or fully replace Portland cement, which is highly energy-intensive. One promising solution lies in the use of low-impact materials such as geopolymers. These materials have the ability to (re)valorize waste generated from recycling processes, thereby conserving natural resources and promoting a circular economy. Additionally, geopolymers can be synthesized from natural resources, such as raw kaolinite clay, offering economical, durable, and high-performance alternatives to conventional cement.

The proposed project is supported by FEDER project "DECA GEO". It aims to develop innovative materials based on kaolinite-type clays or industrial by-products, by substituting Portland cement with acid-activated geopolymer binders, reinforced with colloidal silica nanoparticles and natural fibers like cellulose. The candidate will carry out nanoscale modeling using molecular dynamics method to study the strength and the durability of the new geopolymers as well as their interactions with environment, especially in terms of water and thermal behavior. The project will be conducted in collaboration with the local industrial sector, with the goal of establishing a dedicated industrial supply chain. In the long term, this work will contribute to the development of sustainable, locally sourced materials for low-carbon urban infrastructure, providing a viable alternative to conventional concrete.

**Duration**: 12 months (renewed)

**Candidature**:
Successful candidate should have solid skills in nano-scale modeling especially Molecular dynamics simulations. In addition, good knowledge of geomaterials including experience on nanoscale modeling of minerals, nanomaterials, and cementitious materials is required. The selected candidate should be highly qualified and having a great knowledge and experience in the elaboration of the scientific research.

**Contact**:
Interested candidates can submit their detailed CV (pdf file) to the following address:

ali.zaoui@univ-lille.fr

More information concerning the research group and/or the laboratory can be found at: https://www.lgcge.fr/en/ Or https://ali-zaoui.univ-lille.fr