

PHD POSITIONS ON ECO-FRIENDLY HIGH-PERFORMANCE CONCRETE FOR SUSTAINABLE STRUCTURES

START DATE: OCTOBER 1, 2023

DEADLINE: UNTIL THE POSITION IS FILLED

The University of Liège is an accomplished research institution with more than 3500 researchers and over 2000 doctoral students active across all disciplines: humanities and social sciences, life sciences, health sciences, and medicine. Researchers at ULiège have many opportunities to expand their networks and connections.

Moreover, ULiège welcomes every year numerous researchers, national as well as foreign researchers thanks to the EURAXESS contact center. ULiège seeks to be an attractive research institution by improving working conditions for researchers using the HR Strategy for Researchers (HRS4R), creating an inclusive and supportive research environment through the free of charge assistance mechanism offered to incoming researchers and their families or providing conditions for open, transparent, and merit-based recruitment of research positions.

For more details about what ULiège can offer you as a foreign researcher, please see https://www.recherche.uliege.be/cms/c_9281209/en/mobilite-euraxess or contact: euraxess@uliege.be.

ABOUT THE PROJECT

Aim of research project

The University of Liege launches a 4-year research project on an important contemporary problem in an interdisciplinary team of four academics. The full recovery of mineral construction and demolition wastes as recycled raw materials for concrete production is a yet pending, challenging societal goal due to durability and mechanical requirements. The project aims to create deep scientific knowledge to foster the reduction of landfilling and CO2 emissions, as well as depletion of non-renewable resources by the concrete industry. New solutions will prevent further downcycling by the design for long lasting concrete structures. Complementary valorization pathways for waste concrete will include advanced applications for fine aggregate as a substitute for sand and raw material for alternative binders. The interdisciplinary approach will cover the improvement of service life of sustainable structures, transport properties, eco-efficiency and mechanical performances. Multi-physical and multi-scale studies of materials and concrete structures are thus at the heart of this effort to develop sustainable and durable solutions.

The project is subdivided into four topics, each of which will be carried out by a PhD researcher.

JOB DESCRIPTION

This offer applies to:

“Modelling and assessing of CO2 transport properties of Recycled aggregate concrete”

(principal supervisor Prof. Frederic Collin, f.collin@uliege.be)

The higher water absorption of RAC still raises the question of the durability. Being able to quantify the effect of recycled concrete aggregates on the concrete micro-structure and its consequences on the transport properties is of primordial importance. The PhD candidates will develop a numerical model adapted to integrate the microstructural changes in RAC due to the particular aggregate, based on a numerical homogenization technique referred to Finite Element square (FE2) method. This numerical approach will be calibrated through an experimental campaign performed within the project. Finally, the model will be applied to concrete structures submitted to urban and marine environmental loading conditions during their life-time to evaluate the impact of the presence of CRA on durability performance.

There will be a strong interaction between the four PhD researchers and supervisors, providing for a stimulating interdisciplinary research environment.

YOUR PROFILE

- **Required skills:**
 - ▶ Master in Civil/Mechanical Engineering
 - ▶ Programming skills in Python are an asset

- **Soft skills:**
 - ▶ Ability to work as part of a team
 - ▶ Ability to communicate research results

- **Languages:**
 - ▶ English: working language
 - ▶ French: fluency in French is an asset

EMPLOYMENT TERMS

The earliest starting date of each PhD is October 1, 2023. The duration of each PhD work is 4 years. The successful candidates will receive full scholarships and will have access to cutting-edge laboratories and other facilities at ULiege relevant to their research.

OUR OFFER

The successful candidates will receive full scholarships.

▶ **WHAT ABOUT TRAININGS?**

For more information about training please consult:
https://www.recherche.uliege.be/cms/c_12381524/en/listing-des-formations-transversales

▶ **WORK ENVIRONMENT**

The successful candidates will have access to cutting-edge laboratories and other facilities at ULiege relevant to their research.

HOW TO APPLY

To apply for any of the four PhD positions, please send your CV and motivation letter to **Prof. Boyan Mihaylov** (boyan.mihaylov@uliege.be).

- In the motivation letter, please specify which of the four research topics interests you. You can specify one or more topics.
- In your CV, please provide the names and contacts of at least two references who may be contacted to provide reference letters.

SELECTION PROCEDURE

- ▶ If you are shortlisted, we will contact you for an interview.
- ▶ Applications will be accepted until the PhD positions are filled.

CONTACT DETAILS AND FURTHER INFORMATION

For general information about the research project, please contact Prof. Boyan Mihaylov. If you have specific questions on the research topics, please contact the principal supervisor of the topic of interest.

Information on the processing of your personal

The personal data collected follow your application will be processed by the ArGENCo Department of the University of Liege for the purpose of organizing the selection and recruitment.

These data will be processed based on the execution of pre-contractual measures (art. 6-1, b. of the RGPD)

These data will be kept for the duration of the selection procedure and, at the most, 9 months after the publication of the job offer. This data will not be passed on to third parties.

In accordance with the provisions of the General Data Protection Regulation (EU 2016/679), you may exercise your rights relating to this personal data (right of access, rectification, deletion, limitation, and portability) by contacting the ULiège Data Protection Officer (dpo@uliege.be - Mr. Data Protection Officer, Bât. B9 Cellule "GDPR", Quartier Village 3, Boulevard de Colonster 2, 4000 Liège, Belgium). You also have the right to lodge a complaint with the Data Protection Authority (<https://www.autoriteprotectiondonnees.be> , contact@apd-gba.be).