

# Ph.D. offer : Linking the thermodynamic of supplementary cementitious materials to the optimal formulation of sustainable binders

Record number : OPR-1294

## Overview

### RESEARCH DIRECTION

Fabien Georget, Professeur - Department of Civil and Building Engineering

### INFORMATION

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### ADMINISTRATIVE UNIT(S)

Faculté de génie  
Département de génie civil et de génie du bâtiment

### LEVEL(S)

3e cycle

### LOCATION(S)

Campus de Sherbrooke

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## Project Description

The project : Mitigating climate change is an emergency which is incompatible with the slow empirical validation process of the construction industry. However, the safety of the infrastructure and buildings needs to be guaranteed. It is impossible to fully test each material, and a more efficient scientific-based classification must be defined. This project aims to establish the link between the thermodynamic properties of supplementary cementitious materials (SCMs) and the optimal formulation of the low-carbon binders made with these SCM. The candidate will develop the interpretative workflow to extract meaningful physical properties of novel SCMs, and create a hydration model using these properties to predict the compatibilities of these materials with clinker reactions, and the potential needs for sulfate adjustments or superplasticizer for an optimal use of materials and resources.

Work environment : The Ph.D. will be hosted in the Department of Civil and Building Engineering, at the Université de Sherbrooke (Main Campus). The Ph.D. candidate will be supervised by Prof. Georget, and will benefit from the mentoring of international academic and industrial partners. They will be integrated in the active cement and concrete research group (30 Ph.D. students), and have access to fully equipped facilities for the characterization of materials, and testing of cement and mortars, as well as state-of-the-art modelling and numerical tools.

Task list :

- Develop thermodynamic and kinetic models to link the characterization of novel SCMs and the formulation of low-carbon binders
- Design new workflows for characterization and formulation optimization suitable for industry
- Disseminate and communicate results
- Participation to teaching and lab activities (up to 20%)
- Interdisciplinary
- Master in Civil, Chemical or Environmental Engineering, Material Science, Geology, or equivalent
- Autonomous work in the lab
- Motivation to disseminate and communicate the knowledge generated
- Basic programming knowledge (e.g. Python)
- Curiosity and involvement

Recruitment process : Selected candidates will be contacted two weeks after the deadline to set up a first interview. In this interview the students will be asked to briefly present themselves, their academic parcours so far, and their interest for the project. A second interview

will be organized to detail the project.

How to apply : Send the application to: [apply.netzeroconcrete@usherbrooke.ca](mailto:apply.netzeroconcrete@usherbrooke.ca) January 14 2026 at the latest. The application must contain 1) motivation letter, 2) CV (2 pages max) 3) grades from bachelor and master, and 4) 2 contacts for reference (Name, Affiliation, Email) Incomplete applications will be rejected.

## **Discipline(s) by sector**

## **Funding offered**

Yes

**Sciences naturelles et génie**

Génie civil

The last update was on 14 November 2025. The University reserves the right to modify its projects without notice.