

Transforming low-fidelity seismic response of highway bridges to high-fidelity

Record number : OPR-1160

Overview

RESEARCH DIRECTION

Pedro Alexandre Conde Bandini,
Professeur - Department of Civil and
Building Engineering

ADMINISTRATIVE UNIT(S)

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

INFORMATION

pedro.alexandre.conde.bandini@usherbrooke.ca

LEVEL(S)

2e cycle
3e cycle

LOCATION(S)

Campus de Sherbrooke

Project Description

Reliable deformation estimates under earthquake excitation are crucial in performance-based earthquake engineering. Refined analyses, such as nonlinear time-history analysis, involve complex steps that prevent their routine use by practising engineers. This research project aims to build multi-fidelity surrogate models to transform the seismic demand for highway bridges from a simplified method (low fidelity) to a more refined analysis (high fidelity). Numerical models will be built to represent typical bridges in a regional portfolio, and statistical learning techniques will be used to link simplified and refined analyses. Subsequently, seismic risk assessment will be performed based on the proposed surrogate models.

WHAT WE OFFER: As a PhD or an MSc student, you will join the Faculty of Engineering of the Université de Sherbrooke, a leading university in structural engineering research located in Sherbrooke (QC), Canada. You will learn the principles of advanced earthquake engineering and apply machine-learning techniques to solve structural engineering problems. Your admission will be subject to the university's standard rules. The project will start in January 2026. Teaching assistantship may be discussed.

QUALIFICATIONS: Your qualifications should include an academic background in civil engineering, building engineering, or similar studies with excellent results. Candidates must be curious, creative, rigorous and highly motivated. Given the numerical nature of this research project, a strong interest in numerical modelling and data processing is imperative. Modelling with OpenSees and programming with Python or Matlab would be substantial advantages. Communicating in English (both written and spoken) is essential (knowledge of French is also an advantage).

HOW TO APPLY: If you qualify, please email your (1) resume, (2) transcripts, (3) a one-page research statement (past and future research interests), and (4) a sample publication (if available) to Prof. Pedro Bandini (pedro.bandini@usherbrooke.ca) before July 15, 2025. Please include the record number OPR-??? in the subject line of your email. Interviews will take place at the end of July 2025.

**Discipline(s) by
sector**

Sciences naturelles et génie

Génie civil

Funding offered

Yes

The last update was on 24 October 2025. The University reserves the right to modify its projects without notice.