Broadband Multichannel Active Noise Control for an Active Double-Glazed Partition System

Record number : OPR-1450

Overview

RESEARCH DIRECTION

Philippe Micheau, Professeur - Department of Mechanical Engineering

INFORMATION

philippe.micheau@usherbrooke.ca

RESEARCH CO-DIRECTION

François Grondin, Professeur - Department of Electrical and Computer Engineering

INFORMATION

francois.grondin2@usherbrooke.ca

ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie électrique et de génie informatique
Département de génie mécanique

LEVEL(S)

3e cycle

LOCATION(S)

Campus de Sherbrooke

Project Description

Background
This project was initiated with a Montreal-based industrial partner specializing in double-glazed office partitions. These partitions typically achieve a sound reduction index of 30 to 45 dB, but performance can fall below 20 dB at low frequencies, compromising speech privacy. Active noise control, using loudspeakers, error microphones and real-time electronics integrated within the glazing cavity, can close this gap.

Project objective
Design, develop and experimentally validate a fully integrated active noise control system embedded in a double-glazed partition. The project builds on a first functional prototype (2025) based on an original error-microphone compensation method. It aims to improve performance and robustness, independently of the number of loudspeakers and microphones, with control electronics that fit inside a commercial partition and no on-site calibration at installation.

PhD tasks
- Optimize loudspeaker and microphone placement using numerical simulation (COMSOL Multiphysics)
- Develop the integration of the active control solution within the partition
- Improve error-microphone compensation using machine learning
- Experimentally validate the active partition in a transmission-loss test facility

Candidate profile
Master's degree in acoustics, mechanical engineering, applied physics, signal processing or a related field. Strong background in vibro-acoustic modeling (COMSOL Multiphysics). Interest in real-time controller prototyping, multichannel adaptive FD-FxLMS algorithms (MATLAB/Simulink) and machine learning. Experience with transmission-loss or reverberation chamber measurements and acoustic data analysis (MATLAB). Excellent French (spoken and written) and proficient scientific English.

Environment
CRASH-UdeS, one of the largest acoustics research centers in North America. Multidisciplinary team (mechanical, electrical and computer

engineering), co-supervision by two professors, direct industrial partnership. Fully funded PhD scholarship for 3 years.

How to apply
Send to philippe.micheau@usherbrooke.ca:
- cover letter
- two-page CV
- university transcripts
- contact information for two references and;
- any relevant material (publications, internships, projects).

Discipline(s) by sector

Sciences naturelles et génie

Génie électrique et génie électronique,
Génie mécanique

Funding offered

Yes

Partner(s)

Partenaire industriel de Montréal
(cloisons de bureau à double vitrage)

The last update was on 13 October 2026. The University reserves the right to modify its projects without notice.