

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : ANTONI Given names : Jérôme

Status (prof., assistant prof., ...) : Professor

Laboratory : Laboratoire Vibrations Acoustique (LVA) Website address : <https://lva.insa-lyon.fr/fr>

Institution : INSA Lyon Website address : <https://www.insa-lyon.fr/>

Scientific competence of the supervisor:

ANTONI Jérôme : signal processing, acoustic imaging, inverse problems, system identification
Cosupervisor (join PhD) Prof. WANG Xun (Beihang University, Beijing) : acoustics, structural health monitoring, Bayesian probabilities, belief theory, inverse problems, ambient noise

Two major publications in the field proposed for the PhD :

1. Qihang Qin, Xun Wang, Retrieving dispersion curve of thin-plate structure via non-diffuse ambient noise with transient excitations: Application to passive airfoil icing detection in wind tunnel, MSSP 237, 2025, 113085,
2. Qin Q, Wang X. Detecting ice on plate-like structures via flow-induced random vibration: a dispersion curve shift identification approach. Structural Health Monitoring. 2025;24(3):1313-1326.

Website address of the personal page :

Supervisor's email : jerome.antonini@insa-lyon.fr

Description of the research work proposed for a PhD

Topic # (see list) : VI-2

Title : Identification of structural parameters with sparse irregular arrays

Subject :

In-flight icing threatens aircraft safety by degrading aerodynamic performance, making reliable detection a key challenge in structural health monitoring (SHM). Existing guided wave and intelligent sensing methods rely on active approaches, which are often unsuitable for real-time onboard use due to power and intrusiveness constraints. These limitations hinder their practical deployment in operational environments. Structural parameter identification provides a promising alternative. Finite difference methods allow direct estimation of structural properties from governing equations and have been enhanced through regularization to improve accuracy for both isotropic and anisotropic materials. This approach enables the identification of local material variations associated with ice accretion. However, these methods require regular sensor grids, limiting their applicability to realistic measurement configurations. This project therefore aims to develop a more flexible computational framework that accommodates arbitrary sensor distributions, in particular sparse and irregular, while maintaining accuracy. It integrates correction strategies and optimized spatial sampling to ensure robust reconstruction from sparse data. Ultimately, this work seeks to advance passive ice detection methods and improve aircraft safety.

Keywords :

Deicing, structural health monitoring, sparse sensing, irregular arrays, parameter identification

Expected collaborations :

Join PhD between INSA Lyon and Beihang University, Beijing

Background required from the applicant :

Master in mechanical engineering with a first experience in research

Existence of a PDF file detailing the proposal ("yes" or "no") : yes

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