Polish Academy of Sciences
Institute of Fluid-Flow Machinery
Mechanics of Intelligent Structures Department

Notice of open competition #2:

PhD student

in the frame of the Opus 29 project no 2025/57/B/ST8/00045, entitled: "Non-contact laser-based system for fatigue damage monitoring" funded by the National Science Centre, Poland

We are looking for a talented person holding an MSc title, who is interested in continuing their scientific work and possibly opening a doctoral dissertation.

The main objective of the project is the design, development and analysis of a complete non-contact laser ultrasonic system for narrowband selective Lamb wave mode generation.

Such systems are advantageous for the non-destructive evaluation of structures in comparison to other contact methods, such as ultrasonic testing, which requires a coupling gel. It is also very flexible and allows the selective Lamb wave modes generation, which is not possible with a conventional setup of point-wise pulsed laser excitation and scanning laser Doppler vibrometer sensing. It opens up a new avenue in research for potential improvement in the damage identification of structures. In particular, wavefield imaging based on nonlinear guided waves combined with laser patterns for Lamb wave generation, such as the Archimedean spiral or concentric rings proposed in this project, has not been explored so far. The hypothesis is that such an approach will allow us to detect and identify damage earlier than by using point-wise laser excitation and wavefield imaging based on linear guided waves. It is also anticipated that by using full wavefield measurements and advanced modelling techniques, we will be able to better understand the damage-induced generation of nonlinear guided waves.

The role of the PhD student in this project is analysis of nonlinear Lamb waves induced by damage; development of methods of full wavefield imaging for damage detection, including methods based on machine learning; frequency-mixing analysis and signal processing; assistance in experimental set preparation and measurements; journal papers preparation.

A candidate will be a part of an energetic, curiosity-driven and culturally diverse team working at the Mechanics of Intelligent Structures Department, MISD (http://www.imp.gda.pl/en/o4/z1/). The MISD is a part of the Institute of Fluid-Flow Machinery, which belongs to the Polish Academy of Sciences.

Qualifications

- Proficiency in written and oral English (B2 level or higher)
- Relevant engineering degree (mechanics, mathematics, physics, mechanical engineering, aerospace engineering or related field): MSc
- Mobility and flexibility for conferences (up to twice a year).

We especially seek candidates who:

- possess knowledge in signal processing methods,
- have programming skills,
- can write code in MATLAB language.

Additional assets are certificates related to knowledge and experience in guided wave propagation phenomenon, signal processing and machine learning.
In addition, the following will be assessed:

- the candidates' scientific track record,
- the prizes and distinctions of the candidate resulting from the research carried out.

For further information, please contact Pawel Kudela (pk@imp.gda.pl; phone: +48 58 6995 251).

General information

The period of employment for this position is 48 months, enough to write a PhD thesis. Employment is possible immediately (or after obtaining visas). The deadline for application submission is 30th November 2026, 11 am CET. Online interviews will be conducted with selected candidates upon prior notice and at an individually scheduled time.

Conditions of appointment

The salary is 5000 PLN until the mid-term evaluation and 6500 PLN thereafter. It is a scholarship awarded in accordance with regulations on scientific scholarships for young researchers in research projects financed by the National Science Centre, Poland. The candidate, when the project starts, must be enrolled as a doctoral student or a participant in the doctoral programme. In practice, it means that the candidate can be enrolled in the Tricity Doctoral School of the Polish Academy of Sciences or participate in the project while already enrolled in the doctoral programme (e.g. at the Gdansk University of Technology).

How to apply

The application must contain information about the educational background and work experience. The application, including a CV, grade transcripts (courses with grades) from the graduate studies, a copy of the diploma, a list of publications (if any) and other attachments, should be submitted to Pawel Kudela (pk@imp.gda.pl) with the e-mail subject “Laser project PhD candidate”.