Mohamed Cherif Messaadia University
Souk Ahras

Under the patronage of

Prof. Noura MOUSSA, Rector of Mohammed Cherif Messaadia-Souk Ahras University

Dr. Farida KHAMMAR, Dean of the Faculty of Science and Technology

Prof. Abdelmoumene GUEDRI, Director of the Laboratory of Applications, Management, Maintenance and Rehabilitation of Urban Infrastructure (INFRA-RES)

The Faculty of Science and Technology

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The Laboratory of Applications, Management, Maintenance and Rehabilitation of Urban Infrastructure (INFRA-RES)

in collaboration with:

- ✓ Laboratory of Theoretical Physics and Materials Physics. University Hassiba Benbouali of Chlef, Algeria.
- ✓ Laboratory of Control, testing, Measurement and Simulation in Mechanics. University Hassiba Benbouali of Chlef, Algeria.
- ✓ Laboratory of Electrical Engineering, Electronic and Renewable Energy, Souk Ahras, Algeria
- ✓ Laboratory of Electrical Engineering (LABGET), Echahid Cheikh Larbi Tebessi University, Tebessa, Algeria
- ✓ Laboratory of Electromechanical Systems (LASEM), National Engineering School of Sfax, Sfax, Tunisia.

ORGANIZE

The Workshop

"Means and Methods for Advanced Vibration Analysis Based on Artificial Intelligence of a 400 T/h Boiler of IHI Construction at the GL2Z Complex."

Souk Ahras, Auditorium, November 03, 2025

Presentation of the workshop

As part of the National Research Project (PNR), the project team is organizing a scientific workshop scheduled for **November 3, 2025**, at the University of Souk-Ahras. The theme of this workshop will be:

"Means and Methods for Advanced Vibration Analysis Based on Artificial Intelligence of a 400 T/h Boiler of IHI Construction at the GL2Z Complex."

Throughout the workshops, national and international experts will not only share the theoretical foundations of these advanced techniques but will also present real-world examples from their own research, providing participants with a practical understanding of how these methods are implemented in various projects. These sessions will offer valuable insights into how experimental data and simulations are integrated to optimize solutions and drive scientific discovery.

Additionally, the workshop will serve as an interactive platform where researchers and engineers can engage in discussions on current research needs and challenges within their respective fields. Under the guidance of specialists, participants will have the chance to explore innovative solutions and methodologies that could shape the future of scientific research. The event will also foster collaborations between academic institutions, laboratories, and industry professionals, creating opportunities for future joint ventures and collective advancements in science and technology.

Objectives

The objectives of this event are to:

- ⇒ Present the scientific and technical progress achieved within the framework of the project;
- ⇒ Promote exchanges between researchers, academics, and industrial experts;
- ⇒ Discuss the prospects for applying artificial intelligence to vibration diagnostics in strategic energy facilities.

Research areas

Axis 1: Vibration Acquisition and Modeling

- ⇒ Development and optimization of sensors for collecting vibration data on the boiler.
- ⇒ Signal preprocessing: filtering, denoising, and spectral decomposition (FFT, Wavelet, EMD).
- ⇒ Numerical modeling and multiphysics simulation to understand vibration modes and their interactions with thermal and mechanical phenomena.
- ⇒ Use of high-speed cameras to capture vibratory motion and complement sensor measurements.
- ⇒ Image processing for visible vibration analysis and correlation with measured signals.

Axis 2: Artificial Intelligence for Analysis and Diagnostics

- ⇒ Automatic identification of vibration sources through supervised and unsupervised learning.
- ⇒ Anomaly detection and failure prediction of critical components.
- ⇒ Data fusion from multiple sensors and image processing to enhance diagnostic accuracy and reliability.

Axis 3: Predictive Maintenance and Industrial Optimization

- ⇒ Development of predictive maintenance strategies based on vibration analysis, imaging, and AI algorithms.
- ⇒ Energy optimization and improvement of overall industrial process performance.

Supported by

University Mohamed Cherif Messaâdia, Souk Ahras, Algeria

University Hassiba Ben bouali, Chlef, Algeria

Echahid Cheikh Larbi Tebessi University, Tebessa, Algeria

University of Stax, Sfax, Tunisia

Sonatrach -LQS- GL2Z, Oran, Algeria

Registration Information

Faculty members, researchers, as well as doctoral and master's students who wish to participate in the workshop are invited to register by sending an email to: infrares@univ-soukahras.dz.

Please include the following information in your email no later than October 29, 2025:

- Full Name: …
- Status (Doctoral or Master's student) and field of study: …
- University: …