



# 9<sup>TH</sup> International Conference on Control, Automation, and Diagnosis



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July 1-3, 2025  
Barcelone, Spain

Submission  
deadline: **January 31, 2025**

## CALL FOR PAPERS SPECIAL SESSION ON

### Optimization of Deep Learning Algorithms for Real-Time Rail Infrastructure Wear Estimation: Transfer Learning and Lightweight Models for ICCAD 2025 July 1<sup>st</sup>-3<sup>rd</sup>, 2025, Barcelona, Spain

#### Session Co-Chairs:

- Simon Collart-Dutilleul, Telecommunication COSYS/ESTAS, university Gustave Eiffel, France, [simon.collart-dutilleul@univ-eiffel.fr](mailto:simon.collart-dutilleul@univ-eiffel.fr)
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#### Session description:

With the rapid expansion of rail networks and the increasing demand for efficient and safe transportation systems, ensuring the reliability of rail infrastructure is a paramount concern. Continuous monitoring, prognostic and health management (PHM), and real-time estimation of infrastructure wear are critical to preventing accidents, optimizing maintenance schedules, and reducing operational costs.

This special session focuses on the intersection of deep learning, transfer learning, and lightweight model optimization to address these challenges. Advances in AI, especially in deep learning, offer unparalleled opportunities to analyse real-time sensor data for infrastructure health assessment. The integration of transfer learning enables the reuse of knowledge from pre-trained models, enhancing performance even with limited domain-specific datasets. In contrast, lightweight models ensure scalability and feasibility in resource-constrained environments.

This session aims to showcase innovative methodologies, case studies, and applications that push the boundaries of real-time rail infrastructure monitoring through AI-driven solutions.

The topics of interest include, but are not limited to:

- Application of transfer learning for rail infrastructure wear estimation
- Development of lightweight and efficient deep learning models for real-time monitoring
- AI-driven predictive maintenance strategies for rail systems
- Integration of IoT sensors and edge computing in rail monitoring
- Data fusion techniques for multimodal sensor data analysis
- Case studies on successful AI applications in rail infrastructure assessment
- Challenges and solutions for implementing AI in large-scale rail networks

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#### SUBMISSION

Papers must be submitted electronically for peer review by: **January 31<sup>th</sup>, 2025**

<https://www.iccad-conf.com/submission/>

All papers must be written in English and should describe original work. The length of the paper is limited to a maximum of 6 pages (in the standard IEEE conference double column format).