

Keynote Speaker:

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Smart Monitoring at National Scale: IoT Networks for the Structural Health of Infrastructure

Infrastructure monitoring has become a cornerstone of sustainable development policies worldwide. The increasing age of critical assets, combined with rapid urbanization, climate change, and rising traffic demands, is driving the need for continuous and intelligent supervision of structural conditions. Moving from reactive to preventive maintenance requires the integration of advanced sensing technologies, data analytics, and digital platforms capable of transforming raw measurements into actionable insights.

Italy has recently taken significant steps toward this vision by adopting a coordinated, national approach to Structural Health Monitoring (SHM). Through the deployment of IoT-based sensor networks and their integration into Bridge Management Systems (BMS) and risk classification frameworks, the country is building a comprehensive ecosystem for data-driven infrastructure governance. This initiative aims not only to improve safety and reliability but also to support more efficient maintenance strategies and better allocation of public resources.

The presentation will illustrate the results and lessons learned from implementing IoT-enabled SHM technologies at a large scale. It will explore how these systems contribute to extending the service life of structures, reducing lifecycle costs, and enhancing resilience against environmental and operational stressors. Practical case studies will be presented to demonstrate how interconnected monitoring networks can serve as a foundation for smarter, more sustainable infrastructure management. The session will offer a scalable model for countries seeking to modernize their asset management strategies through digital innovation.