SEMINAR

Statistical Pattern Recognition Tools for SHM:
A Roadmap for Scalable Regional Applications to Enhance Climate Change Resilience

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Location:
UNIPG Campus of Engineering
Via G. Duranti, 93, Perugia
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Timetable:
December 16th 2024 – 3:00 p.m. (CET)

Abstract
This seminar presents an overview of some of the most innovative tools for statistical pattern recognition in the autonomous management of long-term integrated monitoring systems for Structural Health Monitoring (SHM) of large-scale structures. Some of these tools, developed in collaboration with the Department of Civil and Environmental Engineering at the University of Perugia, will be demonstrated in a tutorial session through several real-world case studies. These include techniques for finite element model updating, optimal sensor placement, digital twin development, damage identification, and the integration of Artificial Intelligence to accelerate processes during the feature extraction phase for both modal and structural identification. Finally, the seminar will offer perspectives on the pivotal role of SHM and the open challenges in enhancing the adaptability and resilience of critical infrastructures in the face of the increasingly pressing challenge of climate change.

Prof. E. García-Macías graduated with a Bachelor of Civil Engineering in 2011 at the University of Granada and completed his Ph.D. in 2018 at the University of Seville, Spain. After his time as a post-doctoral researcher in 2019 at the University of Perugia and as a Teaching Fellow at Imperial College London in 2020, he completed a second Ph.D. at the University of Perugia (Italy) in 2023. Currently, he holds a position as Associate Professor at the University of Granada. His main scientific interests are organized along two main lines, including multifunctional composite materials, and SHM. An EB member of ERX, Heritage, and Intelligent Infrastructure and Construction, Dr. García-Macías has published more than 60 high-impact scientific articles, being recognized as one of the World's Top 2% Scientists in 2022 and 2023 according to Stanford University's ranking. The contributions of García-Macías have been recognized by several research awards such as the extraordinary thesis award by the University of Seville, the best thesis award by the Royal Academy of Doctors of Spain, and the Young Investigator Award by the Royal Academy of Sciences of Seville.