



# **Open Research Topics in System Identification and Structural Health Monitoring**

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**Visiting Professor STaRs (Supporting Talented Researchers - UniBG)**

**28 February 2018, 15:00**

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## **ABSTRACT**

Structural identification and health monitoring is a continuously evolving research field that increasingly attracts the interest of researchers, engineers, property stakeholders and infrastructure managers around the world. Among other reasons, this may be attributed to (i) the level of maturity, which the developed methodologies have nowadays reached; and (ii) the increasing requirements for smart monitoring and assessment of existing infrastructures, a significant portion of which is reaching its design life-cycle capacity.

The research on the field currently spans along three interrelated main directions, namely (i) the development of new methodologies and the improvement of the state-of-the-art, (ii) the integration of these with modern instrumentation systems and measurement chains, and (iii) the validation and assessment of the latter via the monitoring of actual structures and infrastructures.

The aim of this presentation is to deliver a current overview of the field and to stress out some individual areas of active research. Focus will be given to critical issues that are frequently encountered in practice, especially in large-scale infrastructures, such as bridges, buildings, structures of cultural heritage, etc. These include, among others,

1. the extraction of structural information using a limited amount of instrumentation,
2. the development of adaptive signal processing methods for improving measurement quality of low-cost sensors,
3. the effective updating of numerical models, when these are available, using monitoring data, and
4. the quantification of the structural uncertainty, as a result of the interaction between the structure and its environment.

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**Dr. Vasilis Dertimanis** received the Diploma in Mechanical Engineering from the University of Patras, Greece and the Ph.D. Degree from the National Technical University of Athens (NTUA), Greece, in the area of modeling and identification of faults in mechanical and structural systems. His research interests are in the area of system identification and structural health monitoring, linear and nonlinear state estimation, active and passive structural vibration control, hybrid testing and optimization. He has served as a Researcher in the NTUA Vehicles Laboratory, the Machine Design Laboratory and the Laboratory for Earthquake Engineering. For more than a decade, he has in parallel self-employed as a freelancer engineer and inspector, as well as measurement engineer and structural vibration analyst. Since 2014, he is a member of the Chair of the Structural Mechanics, ETH Zurich and as of May 2017, he is a Senior Researcher in the chair supporting activities on Monitoring and Dynamic Testing.

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