ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

*Prof. Jan Hesthaven*
*Institute of Mathematics*

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# *SEMINAR OF NUMERICAL ANALYSIS*

➢ **FRIDAY DECEMBER 1ST, 2017 - ROOM MA A3 30 - 15h15**

**Prof. Eleni Chatzi** (ETH, Zürich) will present a seminar entitled:

## « A Monitoring Approach to Smart Infrastructure Management »

Abstract:

The life-cycle management of structural systems operating under diverse loads involves the tasks of simulation (forward engineering), identification (inverse engineering) and maintenance/control actions. The efficient and successful implementation of these tasks is however non-trivial due to the ever-changing nature of these systems, and the variability in their interactive environments. Two defining factors in understanding and interpreting such large-scale systems are nonlinear behavior and structural uncertainty. The former is often related to the external loading, which may shift the structural response from purely linear to nonlinear regimes, while the latter is related to erroneous modeling assumptions, imprecise sensory information, ageing effects, and lack of a priori knowledge of the system itself. In tackling the aforementioned challenges, this talk discusses implementation of methods and tools in the domain of Structural Health Monitoring, which rely on exploitation of sensory information for tracking the condition , or "health", of structural systems throughout their life-cycle. Among other topics, the use of surrogate models and Bayesian-type filters for the reduced representation and real-time identification of uncertain and nonlinear structural systems is discussed. The tools are illustrated on case-studies across diverse engineered systems and infrastructure components.

Lausanne, November 9th, 2017