



POLITECNICO
MILANO 1863

SEMINAR ANNOUNCEMENT

Natta Room, Building 6, ground floor, Leonardo Campus
Department of Civil and Environmental Engineering
June 21st 2018, from 12:15 to 13:15

Smart structures with integrated piezoelectric actuators and sensors – active control and structural monitoring

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Abstract

Adaptive structures and systems play a crucial role in challenging areas of engineering and applied science where high quality performance is required in the presence of changing environment. Introduction of multifunctional materials acting as actuators/sensors but also as an integral part of a structure together with highly integrated control represent the basic concept of smart structures. The evolution of mechanical and aeronautical structures comes out with an increasing demand on the structures to be lighter and at the same time controllable. Overcoming a possible lack of those systems, like their sensitivity to unwanted disturbances as well as demand on continuous supervision of the overall state of smart structures and systems are some of the main research challenges in this field.

In this talk several approaches in the overall design of smart structures and systems will be addressed, with the focus on active vibration control of systems with integrated piezoelectric materials used as actuators and sensors. In the overall design chain (including design, optimization, simulation, control, experimental validation and testing), the advanced control design will be addressed in detail along with actuator/sensor model-based placement optimization. Implementation will be documented by some benchmark examples from the laboratory of the research group Mechanics of Adaptive Systems Ruhr-Universität Bochum. Furthermore, some structural health monitoring approaches based on wave propagation will be also addressed.

Reference: Prof. Giuseppe Cocchetti (giuseppe.cocchetti@polimi.it),

Prof. Giulio Maier (giulio.maier@polimi.it)

Biosketch

Dr.-Ing. Tamara Nestorović is Full Professor of Mechanics of Adaptive Systems at the Ruhr University in Bochum (RUB), Germany, since 2008. She graduated in Mechanical Engineering (Control Systems), in 1994, at the University in Niš, Serbia (at that time Yugoslavia) and got her Master (Magister) Degree in Control Systems at the same Faculty in 2000. After obtaining her Ph.D. in 2005 at the Otto-von-Guericke University in Magdeburg, Germany (best thesis Award by the Association of German Engineers VDI) she researched at the same University and at the Fraunhofer Institute for Factory Operation and Automation IFF, Magdeburg as project leader in the field of smart structures and virtual reality. Prof. Nestorović has authored or co-authored around 200 scientific publications, most of them in the field of active control of smart structures.

Research fields: overall design and control of smart structures, active vibration and noise reduction, experimental identification and real-time control, robust controller design, inversion methods and reconnaissance in mechanized tunneling, structural health monitoring, damage detection and machine diagnosis.

