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臺灣大學應用力學研究所  
演 講 公 告

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# Smart materials-based multifunctional structures for (bio-)sensing and actuating purposes

By Ivo Stachiv

## **Abstract**

Recent advances in material science, nanotechnology and manufacturing have enabled to design smart micro-/nanostructures with superior performance and ultrasensitive response. To ensure these structures can achieve the extraordinary functional properties (e.g., the ultrahigh sensitivity to the given external stimulus), they are usually made of either the novel nanomaterials such as the single-/multiwalled carbon nanotube, graphene and MoS<sub>2</sub> or the multiple material layers, where at least one layer contains (or is made of) a functional material (e.g., shape memory alloys). First, we briefly review the application limits of the standard nanomechanical mass spectrometers in mass sensing of larger analytes (in GDa range) that is of emergent importance in analytical chemistry and medicine. Then, we discuss the novel i) SMA-based nanomechanical resonators for (bio-) sensing applications and ii) PZE-based smart structures. We close with future direction in development of smart systems utilizing smart materials and additive manufacturing.