

**Zakład Komputerowego Wspomagania Projektowania,
Zakład Wytrzymałości Materiałów i Zakład Mechaniki Budowli
Instytutu Konstrukcji Budowlanych, Politechniki Poznańskiej
oraz
Polskie Towarzystwo Mechaniki Teoretycznej i Stosowanej
Oddział Poznań**

W dniu **17 listopada 2014 r.** (poniedziałek) o **godz. 9:45**
w sali **139** budynku Wydziału Budownictwa i Inżynierii Środowiska
przy ul. Piotrowo 5 odbędzie się otwarte seminarium, na którym

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przedstawi referat

Experimental analysis of the size effect in elasticity and determination of material parameters from several higher-order continuum theories

Wszystkich zainteresowanych serdecznie zapraszamy

prof. dr hab. inż. Tomasz Łodygowski

dr hab. inż. Przemysław Litewka, prof. PP

dr hab. inż. Adam Glema, prof. PP

dr hab. inż. Roman Starosta

Abstract

Atomic force microscopy (AFM) will be presented as a method for experimental assessment to the bending behavior of microstructures. In particular, deflection measurements were performed and force data were recorded for micro-beams with decreasing thicknesses, corresponding to the method of size effect from R. Lakes (1995). It is well known that the elastostatic deformation of micro-materials, whose mechanical properties depend on the intrinsic design of its structure, is size dependent, reflected in a stiffer or in a softer elastic response at the micro- and even more at the nanoscale. Higher-order theories of elasticity, like the strain gradient theory of Mindlin's types, micropolar theory, as well as surface theory are presented in order to model bending rigidities and Young's moduli of the micro-beam structures. The influence of the additional material parameters on the bending behavior is worked out theoretically in order to fit the experimental data. Recent results from own experiments will be included for the materials: epoxy, SU-8 polymer, silicon, silicon nitride, aluminum foams and aluminum with artificial inhomogeneities.