

# Micro- or nano-mechanics

Alberto Corigliano<sup>1</sup>, Nicola M. Pugno<sup>2,3</sup>

1. Department of Civil and Environmental Engineering Politecnico di Milano Milano Italy
2. Laboratory of Bio-Inspired & Graphene Nanomechanics, Department of Civil, Environmental and Mechanical Engineering Università di Trento Trento Italy
3. Center for Materials and Microsystems Fondazione Bruno Kessler Povo (Trento) Italy

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## Foreword

Micro- and nano-materials and -structures are experiencing a remarkable scientific interest (e.g. [1–6]) and today even market growth in various fields, like civil, mechanical and aerospace engineering, as well as consumer applications. At the same time, the scientific community is driving application development in the medical, biological [1] and bio-inspired [2] fields, finding more effective designs, manufacturing processes and strategies. It can be said that for various micro- and especially nano-materials and structures the pioneering phase has been substituted by a phase of a rigorous design [3]. Hence, new challenges concerning reliability, optimization and increasing performances must also be tackled by the new designer. These issues could require a multi-physics approach and must be supported by theoretical and numerical modeling, as well as experimental analyses. These will contribute to the definition of a proper design and analysis methodology of micro- and nano-materials and -structures.

It is thus the purpose of this special issue of *Meccanica* to collect papers presented at the “Micro- or Nano- Mechanics” mini-symposium organized by ourselves during the last XX Conference of the Italian Association of Theoretical and Applied Mechanics (AIMETA, September 12–15, 2011, Bologna, Italy) and to focus on recent developments in the fields of theory, numerical and experimental methods on the mechanical behavior of micro- and nano-materials and -structures. Issues like fracture, plasticity, material or structural mechanics, elasticity, damping, tribology, topology optimization, continuum or atomistic simulations, MEMS and NEMS, bio-inspiration, biological and hierarchical materials, etc., were discussed in the Symposium and also touched in the collected papers.

With one of the largest participations, we consider the Symposium as a highly meaningful event in the field of the Micro- [6] or Nano-mechanics in Italy [7].

## References

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