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Preface

The emergence of MEMS and nanotechnology during the last decade has necessitated the engineering modeling community to broaden its horizon to model at a length scale and a time scale that have not been encountered before. The difficult issues encountered include the small size, the small time, the large number of objects, the large aspect ratio, the interacting electric, magnetic, electromagnetic, thermal, and mechanical fields, the mixture of short- and long-range interactions, the highly nonlinear responses, the discrete as well as continuum mechanics, and the non-traditional governing equations. Often special numerical techniques are needed to deal with these issues.

The journal of *Engineering Analysis with Boundary Elements* has the tradition of being at the forefront of developing innovative numerical methods for engineering analysis. To encourage the development of numerical modeling in these micro and nano mechanics fields, the editors of this special issue have assembled eight articles authored by the leading researchers in these fields. The physical problems investigated include the thermal properties of carbon nanotube composites, mechanical properties of micro-fiber reinforced composites, protein and metal surface interaction, dislocation nucleation at crystal surface nanostructures, fluid damping of MEMS, and micromechanical properties of rocks. The numerical methods employed include fast multipole boundary node method, molecular dynamics simulation, method of fundamental solutions, method of continuous dipoles, boundary spectral method, variational boundary integral method, stochastic particle method, and of course, the boundary element method. These articles should represent a good cross-section of the innovative efforts of the numerical modeling community. We hope that by assembling this special issue, we can stimulate further research in numerical modeling of micro and nano mechanics and structures.

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