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COMPUTATIONS OF FLUID FLOWS AT THE SOLID-FLUID INTERFACES

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ABSTRACT

Interest in the behaviour of solid-fluid interfaces has gained tremendous interest recently with the manufacturing of superhydrophobic surfaces. Potential applications include friction-drag reduction, tribolology, anticorrosive protective coatings, microfluidics (micro-channels and reactors), and self-cleaning surfaces, such as window glasses, paints and fabrics. In addition, such surfaces have rekindled the interest in fundamental issues in fluid mechanics, such as the question on the validity of the no-slip boundary condition at the wall. Another example of solid-fluid interface with significant potential for applications are the carbon nanotube-fluid interfaces.

Computational techniques that span a range of physical scales from the molecular level (equilibrium and non-equilibrium molecular dynamics) to the flow conduit scale (finite element, spectral methods etc.) have been used to explore these phenomena and their physical implications. This Minisymposium will be a forum for discussion of the latest developments in this area. We solicit contributions (applications, research issues, algorithms and models) in areas including (but not limited to) the computational aspects of multiscale simulations, macroscopic simulations that incorporate microscopic interfacial interactions (e.g., hydrophobicity and hydrophilicity) and the cause-and-effect manifestations at the macroscopic scale, molecular level simulations that explore the interfacial momentum transfer, and force-force autocorrelations of the fluid molecules at the interface, etc.