

Title: Direct Simulation Approach to Multi-Phase Biomaterial Transport
And Nano-Interactions in Microfluidic Systems

Type: Postdoc

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Description: Multi-phase transport in microchannels is an essential feature in chip-based microfabricated fluidic device that integrate multiple operational steps to analyze and manipulate biomaterials. The underlying physical processes usually involve several length scales and many issues are yet to be well understood. Conventional continuum approach can be conveniently applied to these problems, but it sometimes fails to capture such subtle yet important nanoscopic phenomena as interfacial interactions and phase dynamics. The Lattice Boltzmann technique is a method that can incorporate both nano- and micro-scale events, and is now being proposed to study the complex nano-scale multi-phase motion in microchannels. Successful application of this methodology will enable researchers to better understand the multi-phase nano-transport, and to strategically and intelligently design microfluidic devices for biotechnological applications.