Preface to Special Topic: Papers from the 82nd American Chemical Society Colloid and Surface Science Symposium, Raleigh, North Carolina, 2008

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This Special Topic section of *Biomicrofluidics* contains original contributions that were presented at the 82nd Colloid and Surface Science Symposium, which took place on 15–18 June 2008 at North Carolina State University. The Symposium covered a wide range of topics that are relevant to the fundamentals of fluidics and their application to biological systems. © 2009 American Institute of Physics. [DOI: [10.1063/1.3109652](https://doi.org/10.1063/1.3109652)]

The recent interest in microfluidics and nanofluidics is constantly increasing due to the numerous applications that these techniques have to offer. They have been used for chemical and biomolecular sensing, separation of charged analytes, and single DNA molecule manipulation. These applications were facilitated by the significant increase in the range of advanced microfabrication and nanofabrication techniques. Improving and extending the range of applicability of micro- and nanofluidic techniques also requires better fundamental understanding of the physics of the transport at small length scales. The transport of fluids and solutes in microchannels and nanochannels usually occurs at very small Reynolds regime. The typical length scale and the surface forces (electrostatic, van der Waals, hydrophobic, hydration, etc.) may be comparable to the size of the channels. All these features often require the development of new experimental techniques and approaches for theoretical analysis.

The importance and the substantial recent interest in micro- and nanofluidics prompted the organization of a special session on Electrokinetic Phenomena and Microfluidics as part of the program at the 82nd Colloid and Surface Science Symposium at North Carolina State University in June 2008. The collected papers in this issue of *Biomicrofluidics* cover some of the very important fundamental and engineering aspects of electrokinetic phenomena in micro- and nanofluidic channels. These include molecular dynamics simulation of biomolecules in confined spaces, analysis of the electric double layer effects on the fluid flow in nanochannels, hydrodynamic resistance to droplet motion in microchannels, electrophoresis in nanocomposite gels, and microfluidics for nanoparticle fabrication. The paper by Srivastava *et al.*¹ explores the possibility of using microfluidics for fabrication of Janus nanofibers. Chang² presented a theoretical analysis of the electro-osmosis on a salt-free microchannel by simultaneously solving the nonlinear Poisson–Boltzmann equation for the electrostatic potential distribution and the Navier–Stokes equations for the fluid flow. Trahan and Doyle³ reported theoretical analysis of DNA molecule interaction with obstacles in a microchannel. Finally, Labrot *et al.*⁴ presented studies on the droplet hydrodynamic resistance in a microfluidic channel.

We hope that the reader will find the papers useful and informative.

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