

## Special Issue: Microscale Medical Devices

The medical device industry increasingly relies on complex microfluidic, microelectromechanical, and nanoelectromechanical devices as part of modern clinical treatments and diagnostic testing. The benefits of using microdevices are faster results and lower costs. Fundamental and translational research in microscale medical devices has exploded and is rapidly moving toward commercialization in the device, pharmaceutical, biotechnology, and life science industries. Applications for microscale devices include drug discovery, cell growth, disease studies, diagnostics, biologic sensing, mixing, filtration, and many others. For example, organ-on-a-chip devices have recently been developed that mimic the biologic and physiologic properties of living systems and can be used for early evaluation of new drugs or devices, as well as to study disease state. Likewise, lab-on-a-chip systems that use microsamples of blood are revolutionizing the diagnostic testing industry.

This Special Issue of the ASME *Journal of Medical Devices* highlights original research on latest advancements of microscale devices for medical applications. The contributions utilize experimental (e.g., microfluidics, MEMS, NEMS, AFM) and computational methods (e.g., computational fluid dynamics, finite

element, and analytical analysis) and covers both in vitro and in vivo applications of microscale devices on a wide range of topics.

As Guest Editor, I would like to greatly thank the authors and co-authors for their valuable contributions and the reviewers for the time and efforts. Over 13 full-length research papers and technical briefs were submitted to the special issue, many of which were accepted for publication at the end of the peer-review process. A very special thanks to Coeditor Professor Rupak Banerjee, for his inspiring leadership, significant guidance, and tremendous patience over the past several months. I would also like to thank the ASME editorial staff for their fantastic technical support. We sincerely hope that the JMD community will enjoy this Special Issue.

**Yaling Liu**

**Department of Mechanical Engineering and Mechanics,  
Lehigh University,  
Bethlehem, PA 18015;**

**Department of Bioengineering,  
Lehigh University,  
Bethlehem, PA 18015**