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Acoustofluidics: merging acoustics and microfluidics for biomedical applications

ABSTRACT

The past two decades have witnessed an explosion in lab-on-a-chip research with applications in biology, chemistry, and medicine. The continuous fusion of novel properties of physics into microfluidic environments has enabled the rapid development of this field. Recently, a new lab-on-a-chip frontier has emerged, joining acoustics with microfluidics, termed acoustofluidics. Here we summarize our recent progress in this exciting field and show the depth and breadth of acoustofluidic tools for biomedical applications through many unique examples. These acoustofluidic technologies are capable of delivering high-precision, high-throughput, and high-efficiency cell/particle/fluid manipulation in a simple, inexpensive, cell-phone-sized device. More importantly, the acoustic power intensity and frequency used in these acoustofluidic devices are in a similar range as those used in ultrasonic imaging. With these unique advantages, acoustofluidic technologies meet a crucial need for highly accurate and amenable disease diagnosis (e.g., early cancer detection and prenatal health) as well as effective therapy (e.g., transfusion and immunotherapy).

BIOGRAPHY

Tony Jun Huang is a professor at Department of Mechanical Engineering and Materials Science (MEMS) at Duke University. Previously he was a professor and The Huck Distinguished Chair in Bioengineering Science and Mechanics at The Pennsylvania State University. He received his Ph.D. degree in Mechanical and Aerospace Engineering from the University of California, Los Angeles (UCLA) in 2005. His research interests are in the fields of acoustofluidics, optofluidics, and micro/nano systems for biomedical diagnostics and therapeutics. He has authored/co-authored over 180 peer-reviewed journal publications in these fields. His journal articles have been cited more than 11,000 times, as documented at Google Scholar. He also has 19 patents and invention disclosures. He was elected a fellow of the following five professional societies: the American Institute for Medical and Biological Engineering, the American Society of Mechanical Engineers, the Institute of Electrical and Electronics Engineers, the Institute of Physics, and the Royal Society of Chemistry.

**FRIDAY
JANUARY 19, 2018**

NOON - 1:30 P.M.

**COVERDELL CENTER
AUDITORIUM
(Room 175)**