Jiandi Wan, J Nanomedic Nanotechnol 3:1
doi: http://dx.doi.org/10.4172/2157-7439.S1.08

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Nanotechnology & Nanomedicine
March 12-14, 2012 Omaha Marriott, USA

TITLE

Quantitative and integrative microfluidic studies of vascular signaling dynamics and microbubble emulsion

Jiandi Wan
Princeton University, USA

Microfluidics is the science and technology of systems that can precisely manipulate small amounts of fluids, including the control of cell behaviors and multiphase materials. Microfluidic-based systems, therefore, have the advantages for quantitative and integrative study of biological phenomena and controlled synthesis of functional materials. This talk describes my work and plans on integrating microfluidic-based approaches to explore vascular signaling dynamics and the synthesis of microbubble-based functional materials. Specifically, I will introduce a microfluidic approach that can probe the dynamics of shear-induced ATP release from red blood cells (RBCs) with millisecond resolution and provide quantitative understandings of the mechano-sensitive ATP release processes in RBCs (PNAS, 2008 and 2011). Since extracellular ATP is an important regulatory molecule for many cell functions, and, in particular, for vascular signaling, the developed microfluidic approach is important for mechanistic study of vascular disease, diabetes, and to design effective therapeutic strategies. Furthermore, I will also describe a microfluidic approach that enables the controlled formation of three-phase materials to obtain micron-dimension structuring, e.g., gas-liquid-liquid microemulsions and microparticles with controlled porosity and shell thickness. The developed technology has applications for synthesis of biomedical materials, such as drug delivery particles and ultrasound contrast imaging materials.

Biography:

Dr. Jiandi Wan is currently a Research Associate in the Department of Mechanical and Aerospace Engineering at Princeton University. He obtained his PhD degree in Physical Chemistry from Boston University in 2006 and did the postdoc training in the School of Engineering and Applied Sciences at Harvard University. In 2011, Dr. Wan was appointed as an assistant professor in the Rochester Institute of Technology. Dr. Wan's research includes applications of microfluidics in blood flow dynamics, bacterial quorum sensing, and synthesis of functional materials. Dr. Wan has published more than 25 papers in peer-reviewed journals and has 7 patents in application.