HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES
UNIVERSITY of ROCHESTER

## Department of Chemical Engineering

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## Microfluidic Studies of the Dynamics of Red Blood Cells and Microbubble Emulsions

**Wednesday, October 10, 2012**
**2:15 p.m.**
**101 Goergen Hall**

Microfluidics is the science and technology of systems that can precisely manipulate small amounts of fluids and has been studied widely for the exploration of dynamics of biological phenomena and controlled multiphase flows. This talk describes the main research in my group on integrating microfluidic-based approaches to study signaling dynamics of red cells and microbubble-encapsulated emulsion drops. 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. 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 diseases 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**

Jiandi Wan is currently an assistant professor in the Microsystems Engineering program at the Rochester Institute of Technology. His degrees are in Chemistry from Wuhan University (BS, 1998, MS, 2001) and Boston University (PhD, 2006). Dr. Wan worked as a post-doctoral researcher in the School of Engineering and Applied Sciences at Harvard University from 2006 to 2009 and moved to Princeton University in 2009 as a Research Associate. Dr. Wan's research includes microfluidic approaches for studying of cell signaling dynamics, multiphase emulsions, and advanced materials.