

You are cordially invited to our:  
**Department Seminar**

- Topic:** **Rheological Behavior of Complex Fluid with Deformable and Rigid Particles**
- Speaker:** **Dr Moon Ji Young**  
Visiting Researcher, Mechanical Engineering,  
Engineering and Information Technologies,  
The University of Sydney, Australia
- Date:** **13 September 2017, Wednesday**
- Time:** **2.00pm to 3.00pm**
- Venue:** **Seminar Room E1-06-08 (Block E1, Level 6)**  
*(map of NUS can be found at <http://map.nus.edu.sg/>)*
- Host:** **Prof Shu Chang**

### Abstract

Predicting the rheological properties of particles in matrix is one of the most challenging and complicated problems in material and fluid sciences. The complication is arisen by the particles collision and interactions with the surrounding fluid. A full description of the rheology of particles requires a complete understanding of the interactions between particles, interaction between the particles and the matrix fluid, and interactions between channel and particles. Thus consideration of above factors can lead to a better understanding of the rheological behavior of suspensions with particles flow. In this research, fluid with deformable particle and fluid with rigid particles are considered. A combination model of the three dimensional lattice Boltzmann method (LBM) and the immersed boundary method (IBM) are used to simulate these suspension systems. For the single particle deformation in the flow, the boundary thickness and value on transit time in a microchannel was analyzed. To see the physics behind the single particle in a micro channel, the path selection (navigation) of a single moving particle in a microfluidic channel network was analyzed. To see the interaction between wall property and suspension flow, deformable particles in hydrophobic and hydrophilic surface microfluidic channels was analyzed. To see the effect of particle roughness on rheology, the results of measuring the viscometric flow of concentrated rigid-sphere suspensions with constant-viscosity matrices, both Newtonian (silicone oil) and non-Newtonian were presented. Finally, the rough particle was analyzed by lattice Boltzmann method to find the physics behind the experimental results.

### About the Speaker

Dr. Moon received his joint Ph.D. (2017) in Mechanical Engineering at The University of Sydney and Yonsei University, and his B.S. (2011) in Mechanical Engineering at Yonsei University, Seoul, Korea. During his study at the University of Sydney, he researched rigid particle (rough particle) rheology supervised by Roger I. Tanner. He studied deformable particle rheology at Yonsei University supervised by Joon Sang Lee.

**Admission is free. All are welcome to attend.**