

DEPARTMENT OF MECHANICAL ENGINEERING SEMINAR SERIES

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Carnegie Room 315, Time 3:00pm

Manipulation of particles in microfluidic devices by acoustic forces

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An acoustic particle manipulation technique with microfluidics has been developed for various applications, such as trapping, separation, alignment, and enrichment of particles before detection or sorting. Acoustic particle manipulation is generally performed by the acoustic radiation force associated with a difference in momentum flux between two interfaces. Since the acoustic radiation forces in a fluid are relatively strong and long-range but gentle, it is promising for biological cell applications. Several issues will be addressed in the presentation including plasma extraction from whole blood, separation of particles by size, and density gradient separation of microencapsulated cells in microfluidics. Future potential applications of acoustic manipulation of particles in microdevices to biomedical areas will also be discussed briefly.

Dr. Sehyun Shin acquired his BS (1987) and MS (1989) in Mechanical Engineering from Seoul National University in Korea. He received his PhD in Mechanical Engineering from Drexel in 1993, specializing in non-Newtonian fluid flow and heat transfer and hemorheology. Dr. Shin had worked as an Assistant, Associate and Full Professor in the Department of Mechanical Engineering at Kyunpook National University since 1995. He had served as a director of Brain Korea 21, Mechanical Engineering Unit and a principal director of a National Research Laboratory of Biorheology funded by NRF. In 2007, Dr. Shin joined Korea University as a full professor where he has organized and led a center for integrating of medicine and innovative technology, funded by KHIDI. He has also served as an advisory board member of future planning committee in Korean government. Since 2005, Dr. Shin has served as a council member of International Society of Clinical Hemorheology, general secretary of Korean Society of Rheology, and Vice President of Bioengineering division in KSME. His current research activities include hemorheology and microfluidic devices, cell-machine interface, and biodesign, funded by NRF, KHIDI and Seoul city.

