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# Seminar

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- **SPEAKER**

Prof. Yongdae Shin (Dep. Of Mechanical Engineering, Seoul National Uni.)

- **TITLE**

Using light to control phase separation in living cells

- **ABSTRACT**

The cell is compartmentalized with numerous organelles that facilitate spatio-temporal regulation of biological reactions. Cellular organelles are not limited to canonical membrane-bound structures such as nucleus and mitochondria but include membrane-less assemblies – for example, nucleoli, nuclear speckles and Cajal bodies in nucleus and cytoplasmic stress/germ granules. Emerging evidence suggests that membrane-less structures represent mesoscale liquid-like droplets surrounded by coexisting nucleo/cytoplasm, which form through liquid-liquid phase separation. An aberrant transition from a liquid-like state into solid aggregates is thought to underlie the pathogenesis of several neurodegenerative diseases. In this talk, I will discuss a series of efforts aiming to develop novel optogenetic technologies that enable the control of intracellular phases. Using these tools, a relation between different material states (liquid vs solid) has been examined and physical parameters shaping localized phase separation are probed. A recent version of the optogenetic approach combines genomic targeting with phase separating modules, revealing an interesting mechanical interplay between phase-separated liquids and surrounding genome. Together, these approaches open a new opportunity to navigate intracellular phase space which is central to the basic biology of cellular organization as well as the onset of protein condensation diseases.

- **DATE AND VENUE**

August 21, 2019 (Wednesday, 11:00 - 12:00)  
Seminar Room A (116), KU R&D Center

- **INVITED BY**

Professor Sang-Hee Shim