

*Weldon School of Biomedical Engineering
Special Seminar*

Thursday, March 2, 2023

9:15 – 10:15am, MJIS 2001 (note new time and location)

or via zoom <https://purdue-edu.zoom.us/j/93793770670>

Reconstitution of Actin Cytoskeletal Dynamics and Functions



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Abstract: The actin cytoskeleton regulates various key functions of the cell, including division, motility, and polarity establishment. Ultrastructural and molecular biological studies have revealed the nanoscale structures, molecular components, and signaling cascades regulating the actin cytoskeleton step by step. However, it remains unclear how nanometer-sized molecules are self-organized into cell-scale structures and how they cooperate to drive cell functions. To understand the underlying physical principles that govern the cytoskeletal assembly and cell morphogenesis, we employed an in vitro reconstitution approach. We established a method to encapsulate purified proteins or the cytoplasmic extracts of living cells into cell-sized capsules. Using this minimal model of the cell, we are seeking biochemical and physical conditions under which structures and functions recapitulating living cells are self-organized. In this seminar, I will present our recent efforts in understanding the regulatory mechanisms of cell division machinery and motility.

Biography: Makito completed doctoral degree at Kyoto University. He did his postdoctoral work with Prof. Shin'ichi Ishiwata at Waseda University reconstituting active cytoskeleton from purified proteins. After working as Assistant Professor at Waseda University, he joined The Hakubi Center for Advanced Research at Kyoto University as a Principal Investigator in October 2017. He started his laboratory aiming to understand the self-organization mechanism of the cytoskeleton and biological functions, using a combination of single-molecule, in vitro reconstitution, and live cell experiments, and theories of physics. He was appointed as Program-Specific Associate Professor at Department of Physics, Kyoto University in October 2022.

~ BME Host: Taeyoon Kim ~