July 7th, 2022, 16:00-17:00, JST

Online (Zoom) and Large Meeting Room, 2nd floor, Yamate 3rd bldg.

The 8th Okazaki Molecular Engine Seminar

Associate Professor, Department of Chemistry, Indiana University, USA

Dr. Yan Yu

Nanoscale Biophysics of the Innate Immune System

Understanding and controlling immune responses holds great promise for the development of precision medicine. Functions of immune cells depend on the intricately organized chemical reactions and physical forces. Examples range from the engulfment of invading bacteria that relies on a fine balance of competing mechanical forces, to the activation of T-lymphocytes that requires collective interactions between thousands of receptors at the junction between cells. Owing to the complexity of these processes, understanding immune functions using traditional biological tools alone is challenging.

In this talk, I will present my group's recent research progress toward the development of nanotechnology-based biophysical tools for the quantitative imaging and manipulation of immune cells during host-pathogen interactions. Our research so far has capitalized on Janus particles, which, like the two-faced Roman god Janus, are made chemically, biologically, optically or magnetically asymmetric. Integrating Janus particle-based toolsets with super-resolution microscopy, we uncovered new mechanisms in immune regulation, from receptor crosstalk, phagocytosis, to intracellular degradation, which would otherwise be difficult to access with traditional means.

Selected Publications

1. **Li W et al., *PNAS*, 116, 25106-114 (2019)**
2. **Li M et al., *Sci Adv*, 6, eabc8482 (2020)**
3. **Li W et al., *Sci Rep*, 11, 13430 (2021)**
4. **Li M et al., *Biophys J*, 121, 966-976 (2022)**

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