



Department of  
Mechanical Engineering  
The University of Hong Kong



## SEMINAR

### Learning cytometers beyond human limit

**Date:** 9 June, 2025 (Monday)  
**Time:** 2:00 p.m.  
**Venue:** Room 7-34 & 7-35, Haking Wong Building  
HKU

**Speaker:** Professor Sadao Ota  
University of Tokyo  
Japan

#### Abstract:

Optical cell analysis techniques have relied on hypothesis and verification using known biomarkers, primarily by measuring fluorescence intensity. But do we always know enough about cells to determine what indicators to use and how to analyze them? When we measure large-scale physical information of life systems, can we process it properly and maximize its value to biomedicine? In this talk, I introduce developing and applying a series of Learning Cytometers that combine optics, microfluidics, chemistry, and information science to challenge the traditional view of cytometry.

I first present Ghost Cytometry, a data-driven “imaging” flow cytometry approach that enabled the world’s first high throughput “imaging” cell sorter (Science 2018, eLife 2021, Cell Rep Met, Stem Cell Rep 2024), which has been commercialized worldwide. More recently, we further developed a method to enable cell identification based on time-lapse analysis of multiparametric data, exploring the paths to identify critical cells beyond biomarkers.

If I have time, I am planning to present a newer platform that provides droplet microfluidics with multimodal (optical and molecular) barcodes that connect measurements performed across different times and instruments in a scalable and flexible manner. This platform combines a high-throughput 3D imager, based on single-lens objective light-sheet microscopy, with novel, large-scale, bottom-up synthesized, multimodal droplet barcoding materials.

**Biography:**

Sadao earned his BS in Engineering from the University of Tokyo (UTokyo) in 2007 and completed his Ph.D. program in optical, mechanical, and bioengineering in Prof. Xiang Zhang's group at UC Berkeley in 2013. In 2018, he started a networked biophotonics group and currently a professor at Research Center for Advanced Science and Technology (RCAST) of UTokyo UT and a head director of the Laboratories for Systems Biology and Medicine. Alongside his academic roles, Sadao serves as the CSO of ThinkCyte Inc., a company he co-founded in 2016 to commercialize his cell analysis technologies.

**ALL INTERESTED ARE WELCOME**

**For further information, please contact Prof. X.B. Yin at 3910 2659.**