

## **From Biomechanics to Molecular Affinity to Systems Immunology – My Path in Biomedical Engineering That is Inspired by Dr. YC Fung**

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**Abstract:** Force is not only involved in motion, but also involved in molecular interactions that guide cells to execute important physiological functions. Getting to know Dr. Fung at an early age shaped my college major decision, which lead me into the field of biomedical engineering. Applying a force-based measurement tool to study T cell receptor interaction with ligands in graduate school prepared me to use technology development as a foundation to answer important biological and clinical questions.

By combining engineering principle, quantitative modeling, and a deep understanding of biology and medicine, my current research focuses in systems immunology and immune engineering. Understanding etiologies of human immune system related diseases directly in humans and developing novel therapeutics for humans are highly challenging. Inevitably, technology development has paved the way for most of our inquiries in these areas and will continue to be a critical element as we harness the power of the human immune system to engineer new therapeutics. In my lab, we have been at the forefront of developing high-throughput single cell profiling technologies that are capable to interrogate multiple parameters of single human T cells. These technologies make it possible for us to dissect the mechanisms of disease initiation and progression directly in humans. These in turn provide us biomarkers that we can further develop into early disease diagnosis or engineer into novel therapeutics.

Systems immunology and immune engineering is an emerging area of Biomedical Engineering, which will play a significant role in future human health. Looking back, I am deeply grateful for Dr. Fung's influence on my career choice in Biomedical Engineering.