



Department of
Mechanical Engineering
The University of Hong Kong



SEMINAR

Engineering synthetic genetic circuits in droplet microfluidic cell-free systems

- Date:** 26 April, 2023 (Wednesday)
Time: 4:00 p.m.
Venue: Room 7-34, Haking Wong Building, HKU
- Speaker:** Mr. Lau Kwan Kiu (Ph.D. candidate)
Department of Mechanical Engineering
The University of Hong Kong

Abstract:

Synthetic biology is the development of programmable biological systems not necessarily found in nature. These systems are usually implemented using synthetic genetic circuits (SGCs), in which the expression of genes of interest are manually regulated to control cellular behaviour. Existing protocols typically rely on the top-down approach: in which synthetic components are introduced into existing biological systems. An intrinsic problem encountered in this approach is the presence of unwanted interactions between the host cell's components and the synthetic parts. These interactions have significantly reduced the predictability of the actual behaviour of SGCs, resulting in a lengthy development timespan.

As various microfluidic technologies emerge, the synthetic biology community has this begun exploring the bottom-up approach. This approach attempts to reconstitute biological processes through assembling their essential molecular parts. One of the earliest examples of this is the Protein synthesis Using Recombinant Elements (PURE) system, which isolates the protein synthesis pathway (From DNA to protein) from its native cellular context. Unwanted side reactions are kept to a minimum in these systems due to their well-defined composition, making them an ideal testbed for SGCs. This seminar reviews the enabling technologies and challenges to be tackled to construct a minimal testbed for SGCs.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. A. Shum at ashum@hku.hk.