

**DEPARTMENT OF MECHANICAL ENGINEERING****SEMINAR****Online**

Title: Self-synchronization of reinjected droplets for high-efficiency droplet pairing and merging

Speaker: Miss Mao Tianjiao (PhD candidate)
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Date: 22 April, 2022 (Friday)

Time: 11:00 a.m. (Hong Kong Time)

Zoom meeting: 1) Link to join the meeting:

<https://hku.zoom.us/j/94117294788?pwd=SGZJM3M5Qjd1QlVwd3p3ZEpWSjFDdz09>

2) Meeting ID: 941 1729 4788

3) Password: 097852

Abstract:

Droplet merging serves as a powerful tool to add reagents and conduct multi-step reactions. However, unstable droplet synchronization and pairing impede high-efficiency merging. Here, we develop a microfluidic design for self-synchronization of reinjected droplets. Each droplet alternately blocks its counterpart and enters the channel, followed by downstream spacing and merging. Absolutely stable merging can be achieved, with over 98% of the droplets maintaining synchronized at varied droplet sizes and reinjection flow rates. Moreover, the droplet pairing ratio can be adjusted flexibly. Using this strategy, we produce uniform quinoneimine droplets by merging one batch of droplets containing glucose and glucose oxidase with another batch of droplets incorporating horseradish peroxidase (HRP) and HRP substrate, demonstrating the great potential of our system to conduct multi-step reaction. We expect that this system can be integrated with other droplet manipulation systems for broad ranges of chemical and biological applications.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. A. Shum at 3917 7904.

Research areas: Advanced Materials and Biomedical Engineering