

先端科学高等研究院 超省エネルギープロセス研究ユニット 第32回セミナー

以下の通り台湾国立清華大学の何先生を招いてMicrofluidics技術に関するセミナーを開催致します。セミナーはオープンですので興味のある方はご参加下さい。

Date: 13:00 – 14:30, Jun 23 (Thursday), 2022

日程: 2022年6月23日 (木) 13:00~14:30

Place: Exercise room 2 (Electronic Information Eng. Bldg. 4th floor)

場所: 演習室 2 (電子情報工学棟 4 階)

【Presentation title】

"The Coming of Age of Microfluidics: EDA Solutions for Enabling Biochemistry on a Chip"

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【abstract】

Advances in microfluidic technologies have led to the emergence of biochip devices for automating laboratory procedures in biochemistry and molecular biology. Corresponding systems are revolutionizing a diverse range of applications, e.g. point-of-care clinical diagnostics, drug discovery, and DNA sequencing—with an increasing market. However, continued growth (and larger revenues resulting from technology adoption by pharmaceutical and healthcare companies) depends on advances in chip integration and design-automation tools. Thus, there is a need to deliver the same level of design automation support to the biochip designer that the semiconductor industry now takes for granted. In particular, the design of efficient design automation algorithms for implementing biochemistry protocols to ensure that biochips are as versatile as the macro-labs that they are intended to replace. This talk will first describe technology platforms for accomplishing “biochemistry on a chip”, and introduce the audience to both the droplet-based “digital” microfluidics based on electrowetting actuation and flow-based “continuous” microfluidics based on microvalve technology. Next, the presenter will describe system-level synthesis includes operation scheduling and resource binding algorithms, and physical-level synthesis includes placement and routing optimizations. Moreover, control synthesis and sensor feedback-based cyberphysical adaptation will be presented. In this way, the audience will see how a “biochip compiler” can translate protocol descriptions provided by an end user (e.g., a chemist or a nurse at a doctor’s clinic) to a set of optimized and executable fluidic instructions that will run on the underlying microfluidic platform. Finally, present status and future challenges of open-source microfluidic ecosystem will be covered.