



北京大学高能效计算与应用中心学术报告

Invited Talk, Center for Energy-Efficient Computing and Applications

DIGITAL MICROFLUIDIC HARDWARE/SOFTWARE CO-DESIGN AND CYBERPHYSICAL SYSTEM INTEGRATION

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理科五号楼410会议室



ABSTRACT: Advances in droplet-based digital microfluidic biochips (DMFBs) have led to the emergence of biochips for automating laboratory procedures in biochemistry and molecular biology. To meet the challenges of increasing design complexity and precision, the interplay between hardware and software through sensor-based cyberphysical integration will be involved to build DMFBs effectively. This talk offers attendees an opportunity to bridge the semiconductor ICs/system industry with the biomedical and pharmaceutical industries. The talk will first describe emerging applications in biology and biochemistry that can benefit from advances in electronic “biochips”. The presenter will next describe technology platforms for accomplishing “biochemistry on a chip”, and introduce the audience to microarrays and fluidic actuation methods based on microfluidics. Next, the presenter will describe fabrication techniques for digital microfluidic biochips, followed by computer-aided design, design-for-testability, cyberphysical integration, and reconfiguration aspects of chip/system design. In this way, the audience will see how a “biochip compiler” can translate protocol descriptions provided by an end user to a set of optimized and executable fluidic instructions that will run on the underlying digital microfluidic platform.

BIOGRAPHY: Tsung-Yi Ho received his Ph.D. degree in Electrical Engineering from National Taiwan University, Taipei, Taiwan, ROC, in 2005. Since 2007, he has been with the Department of Computer Science and Information Engineering, National Cheng Kung University, Tainan, Taiwan, ROC, where he is currently an Associate Professor. His research interests include design automation for microfluidic biochips and nanometer integrated circuits. He has published several papers in top journals and conference such as IEEE TCAD, ACM TODAES, ACM/IEEE DAC, IEEE/ACM ICCAD, ACM ISPD, and etc. He was the recipient of many research awards, such as Dr. Wu Ta-You Memorial Award of National Science Council (NSC) of Taiwan (the most prestigious award from NSC for junior researchers), Distinguished Young Scholar Award of Taiwan IC Design Society, ACM Taipei Chapter Young Researcher Award, IEEE Tainan Chapter Gold Member Award, the Invitational Fellowship of the Japan Society for the Promotion of Science (JSPS), Japan, and the Humboldt Research Fellowship from the Alexander von Humboldt Foundation, Germany. He is a senior member of IEEE.