Department of Computer Science
香港城市大學
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COMPUTER SCIENCE COLLOQUIUM

When Machine Learning Meets IC Fabrication: Computer Vision-Powered IC Design for Manufacturability (DfM)

SPEAKER **Prof Chia-Wen LIN**

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VENUE Y5-303, 5th Floor, Yellow Zone, Yeung Kin Man Academic Building, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon Tong

ABSTRACT

Traditionally, after ID circuit design and layout, it takes months to fabricate an IC wafer, involving a multiple-step sequence of photolithographic and chemical etch processing, which can significantly deform the layout patterns and is too complex to model mathematically. We aim to develop deep learning-based EDA tools to identify potential circuit defects (e.g., broken wires and short circuits) due to circuit shape deformations caused by a fabrication process in a fully automatic and cost-effective manner. To this end, we address the following issues essential for IC design for manufacturability (DfM): (1) How to predict the manufactured IC circuit shape deformation from an IC layout so as to assess the layout quality for an IC-fab process; (2) How to automatically optimize photomask patterns so that the manufactured IC circuit shape can match the design patterns as close as possible; (3) How to efficiently update the learned prediction models by detecting and learning from novel layout patterns; (4) How to detect lithography hotspot regions based on a learned object detector and litho-simulator. In this talk, we will show how deep learning techniques can effectively and efficiently address the above issues and help improve IC DfM.

BIOGRAPHY

Prof. Chia-Wen Lin is currently a Distinguished Professor with the Department of Electrical Engineering, National Tsing Hua University (NTHU), Taiwan. He also serves as Deputy Director of the AI Research Center and Director of NTHU-LITEON Joint Research Center of NTHU. He was Visiting Professor at Nanyang Technological University, Singapore, in 2024, at Kyoto University, Japan, in 2023, and at Nagoya University, Japan, in 2019. His research interests include image/video processing, computer vision, and video networking. Dr. Lin is an IEEE Fellow, and has served on IEEE Circuits and Systems Society (CASS) Fellow Evaluation Committee during 2021-2023. He serves as IEEE CASS BoG members-at-Large during 2022-2024. He was Steering Committee Chair of IEEE ICME (2020-2021), IEEE CASS Distinguished Lecturer (2018-2019), APSIPA Distinguished Lecturer (2023-2024), and President of the Chinese Image Processing and Pattern Recognition (IPPR) Association, Taiwan (2019-2020). He has served as Associate Editor of IEEE Transactions on Image Processing, IEEE Transactions on Multimedia, IEEE Transactions on Circuits and Systems for Video Technology, and IEEE Multimedia. He served as TPC Chair of IEEE ICME in 2010, IEEE ICIP in 2019, and PCS in 2022, and the Conference Chair of IEEE VCIP in 2018 and PCS in 2024.

All are welcome!

In case of questions, please contact Prof. WANG Shiqi at shiqwang@cityu.edu.hk, or visit the CS Departmental Seminar Web at https://www.cs.cityu.edu.hk/events/cs-seminars/recent-cs-colloquiums.