

# Joint CQSE and CASTS Seminar

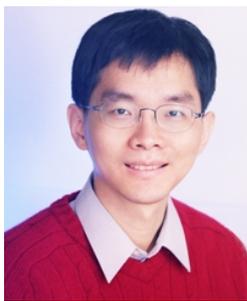
2020  
October 23, Friday

TIME Oct. 23, 2020, 2:30~3:30pm  
TITLE Testing for Quantum Circuits (for EDA's perspective)  
SPEAKER Prof. Chien-Mo (James) Li  
Department of Electrical Engineering, NTU  
PLACE Rm104, Chin-Pao Yang Lecture Hall,  
CCMS & New Physics Building, NTU

## Abstract

Researchers now use randomized benchmarking or quantum volume to test quantum circuits (QC) in the laboratory. However, these tests are long and their fault coverage is unclear. In this talk, we propose behavior fault models based on the function of quantum gates. These fault models are scalable because the number of faults is polynomial, not exponential, to the size of QC. We propose a novel test generation that uses gradient descent to generate test configuration with short length. We revise the chi-square statistical method to decide the number of test repetitions under the specified test escape and overkill. Experimental results on IBM Q systems show that our generated test configurations are effective, and our test lengths are 1,000X shorter than traditional test methods.

## Biography Brief:



James Chien-Mo Li received his BSEE degree in 1993 from National Taiwan University, Taipei, Taiwan. He received his MSEE and PhD degrees in electrical engineering from Stanford University in 1997 and 2002 respectively. He is currently a professor of Graduate Institute of Electronics Engineering, National Taiwan University, Taipei, Taiwan. His research interest includes test generation, low power testing, diagnosis and quantum circuit testing. He has coauthored three books in EDA and testing.

## - N O T I C E -

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