VIRTUAL PROBE: A STATISTICAL FRAMEWORK FOR LOW-COST VARIABILITY CHARACTERIZATION OF NANOSCALE INTEGRATED CIRCUITS

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ABSTRACT: The aggressive scaling of CMOS technology results in large-scale process variations and makes it continually more challenging to create reliable and robust IC design. In this talk, a new technique, referred to as virtual probe (VP), will be presented to efficiently measure, characterize and monitor spatially-correlated variations for nanoscale manufacturing process. VP exploits recent breakthroughs in compressed sensing to accurately predict spatial variations from an exceptionally small set of measurement data. During this presentation, the background on compressed sensing, including its problem formulation and numerical solvers, will be briefly reviewed. Next, the VP methodology and several application examples will be presented. Our experimental results based on industrial measurement data demonstrate the superior performance of VP over other state-of-the-art techniques.

BIOGRAPHY: Xin Li received the Ph.D. degree in Electrical and Computer Engineering from Carnegie Mellon University, Pittsburgh, PA in 2005, and the M.S. and B.S. degrees in Electronics Engineering from Fudan University, Shanghai, China in 2001 and 1998, respectively. He is currently an Associate Professor in the Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA. In 2005, he co-founded Xigmix Inc. to commercialize his PhD research, and served as the Chief Technical Officer until the company was acquired by Extreme DA in 2007. In 2011, Extreme DA was further acquired by Synopsis (Nasdaq: SNPS). His research interests include integrated circuit and biomedical signal processing.