



## DESIGN FOR X (DFX) IN EXTREME SCALING AND EMERGING TECHNOLOGIES

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**ABSTRACT:** As the semiconductor industry enters the era of extreme scaling (1x-nm), IC design and manufacturing challenges are exacerbated, which calls for increasing design and technology co-optimization for performance, power, manufacturability, and so on. Design for X (DFx, where X can mean power, performance, manufacturability/yield, reliability, security, ...) requires cross-layer information feed-forward and feed-back, to enable the overall design and manufacturing closure and optimization. This talk will first present some key challenges and practices how to enable DFx from mask synthesis to standard cell and physical design, dealing with multiple patterning lithography, and leveraging machine learning, etc. As new process technologies being proposed (e.g., new materials) and new design requirements (e.g., reliability and security) popping up, we expect to see many new challenges and opportunities for synergistic DFx. The talk will also cover some DFx needs for emerging technologies such as nanophotonic integration and emerging applications such as FPGA.

**BIOGRAPHY:** David Z. Pan received his BS degree in Physics from Peking University in 1992, and his PhD degree in Computer Science from UCLA in 2000. He was a Research Staff Member at IBM T. J. Watson Research Center from 2000 to 2003. He is currently Engineering Foundation Professor at the Department of Electrical and Computer Engineering, The University of Texas at Austin. He has published over 300 refereed journal/conference papers and 8 US patents, and graduated over 20 PhD students who are holding key academic and industry positions. He has served in many premier journal editorial boards and conference committees, including various leadership roles. He has received a number of awards, including the SRC Technical Excellence Award, 14 Best Paper Awards, DAC Top 10 Author Award in Fifth Decade, ASP-DAC Frequently Cited Author Award, Communications of ACM Research Highlights, ACM/SIGDA Outstanding New Faculty Award, NSF CAREER Award, NSFC Overseas and Hong Kong/Macau Scholars Collaborative Research Award, SRC Inventor Recognition Award three times, IBM Faculty Award four times, UCLA Engineering Distinguished Young Alumnus Award, UT Austin RAISE Faculty Excellence Award, many international CAD contest awards, among others. He is a Fellow of IEEE and SPIE.