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Design for Manufacturability for Sub-14 Nanometer Technologies

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As process nodes continue to shrink, the semiconductor industry faces severe manufacturing challenges. Four most expected technologies may push the limits of lithography: multiple patterning lithography, extreme ultraviolet lithography, electron beam lithography, and directed self-assembly. We investigate the most critical design challenges of the four technologies and provide our solutions, which can contribute to the continuing scaling of the CMOS technology. Finally, we provide some future research directions for the addressed technologies.

Biography: Yao-Wen Chang received his Ph.D. degree from the University of Texas at Austin in 1996 in computer science. He is currently the MXIC Chair Professor and an Associate Dean of the EECS College, National Taiwan University (NTU). He was the Director of the Graduate Institute of Electronics Engineering of NTU 2010-2013 and Visiting Professor at Waseda University, Japan 2004—2011. His current research interest lies in electronic design automation (EDA). He has coauthored an EDA textbook (Morgan Kaufmann) and a routing book (Springer) and over 250 ACM/IEEE conference/journal papers, including highly cited papers on EDA and FPGA design. Dr. Chang has received many research/teaching awards, including four awards at the 50th ACM/IEEE DAC in 2013 (e.g., the 1st Most Papers in the Fifth Decade 2004-2013 [#1 worldwide with 34 papers]), the sole six 1st-place awards of recent ACM/IEEE EDA contests, seven best paper awards and 22 best paper nominations, the Distinguished Research Awards from the Taiwan MoST (three times), the IBM Faculty Awards (three times), and the NTU distinguished teaching award (highest honor). Dr. Chang is currently the Vice President of Technical Activities of the IEEE Council on EDA and the past chair of IEEE/ACM ICCAD. He has served as Associate Editor of IEEE TCAD, IEEE TVLSI, IEEE D&T, etc. and on the program committees of all major EDA conferences, and as program / general / steering committee chairs of ACM ISPD and program chairs of ASP-DAC, ICCAD, and FPT. He has also served as an independent board director of Genesys Logic, a technical consultant of Faraday, MediaTek, and RealTek, and the Chair of the MOE EDA Consortium. Dr. Chang is a co-founder of the Maxeda Technology. He is an IEEE Fellow.