

Beyond FINFET era: Challenges and opportunities for CMOS technology

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Abstract: Invention of FINFET and its introduction to mass production are among the most important breakthroughs in the recent CMOS technology history. With the excellent SCE control capability and process extendibility, FINFET architecture has enabled the industry to push technology scaling advancement in the past decade. Now the industry is at another important juncture where to further the scaling trend, transitioning from FINFET to Nanosheet becomes clear and imminent. In this tutorial, we will walk through some of the recent advancement in nanosheet technology and why it is the best candidate beyond FINFET, we will also review the latest research directions for device architectural options beyond Nanosheet and the corresponding challenges and opportunities. In addition to the FEOL device options, a brief review of the recent DTCO and BEOL advancement will also be included in this tutorial.

Bio: Dr. Zhao received his B.S and M.S. degree from University of Science and Technology of China in 2002 and then Ph.D in physics from University of California, San Diego in 2008. After that, he joined IBM T.J.Watson research center as postdoc researcher, working on fundamental study of HKMG reliability kinetics. In 2010, he moved to IBM SRDC SOI device team and started his journey of leading-edge CMOS technology research and development. Later, he joined GlobalFoundries in 2015 and returned to IBM research in Albany in 2018. Over the past years, Dr. Zhao has developed extensive experience in the field of advanced CMOS device design and process. His current work focuses on advanced logic device architectural options beyond FINFET.