

## Tutorial 5: Innovative technology elements to enable CMOS scaling in 3nm and beyond – device architectures, parasitics and materials

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### Abstract:

CMOS technology is crucial for the foundation of next-generation computing in various application domains. This fact fuels a strong technical appetite for further CMOS scaling down to 3nm and beyond. However, this necessitates the development of new device architecture beyond FinFET in order to overcome the barrier of CMOS scaling as it exists now.

In this study, we will review a few key innovative device architectures such as Forksheet and CFET for next-generation CMOS device architectures. We will share the results from device to block level performance to provide comprehensive views of new architectures. However, it should be pointed out that innovative device architectures alone may not be sufficient to enable cell and block-level scaling. Since performance impact and routability of a block strongly depends on interconnects in advanced architectures, we believe the innovative interconnects should be simultaneously considered in combination with device architectures in sub-5nm node. As an example, we will provide a deep dive into smart power delivery with buried power rails and the optimization of power distribution networks.

Finally, we plan to discuss the challenges and opportunities of 2D materials for beyond SI channel for next-generation CMOS scaling.

### Speaker's Bio:

Dr. Myung-Hee Na is a semiconductor technologist and currently work at imec as the Vice President of Technology Solutions and Enablement. She is currently responsible for CMOS and AI hardware technology research for new semiconductor era. Myung-Hee received a Ph. D in Physics and started her career at IBM in 2001 where she held various technical, managerial and executive roles until early 2019. At IBM, she successfully led Research and Development for multiple generations of semiconductor technologies, including high-K metal gate, FinFET, and Nanosheet development. Moreover, she has co-authored numerous research papers and holds several U.S. and international patents.