

ECE DISTINGUISHED SPEAKER

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**AI and Intelligent IC/Accelerator Design: A Synergistic Approach**

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140 ISEC  
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**Abstract:**

The recent artificial intelligence (AI) boom has been largely driven by three confluence forces: algorithms, big data, and computing power enabled by modern integrated circuits (ICs) including specialized AI accelerators. In this talk, I will present a synergistic approach on AI and intelligent IC/accelerator designs with two main themes, AI for IC and IC for AI. As the semiconductor technology enters the era of extreme scaling, IC design and manufacturing complexities are becoming extremely high. More intelligent and agile IC design technologies are needed than ever to optimize performance, power, area, manufacturability, reliability, security, etc., and to deliver equivalent scaling to Moore’s Law. I will present some recent results leveraging modern AI and machine learning advancement with domain-specific customizations for agile IC design and manufacturing closure. Meanwhile, customized IC can drastically improve AI performance and energy efficiency by orders of magnitude. I will present the hardware/software co-design for energy-efficient neural networks. The bidirectional reinforcement of AI and IC technologies holds great potential to significantly advance the state-of-the-art of each other.

**Bio:**

David Z. Pan received his BS degree in Physics from Peking University and his MS/PhD degrees in Computer Science from UCLA. From 2000 to 2003, he was a Research Staff Member with the IBM T. J. Watson Research Center. He is Engineering Foundation Professor at the Department of Electrical and Computer Engineering, University of Texas at Austin. He is also currently a Visiting Professor/Scientist at MIT EECS/MTL.  His research interests include bidirectional AI and IC interaction, cross-layer design for manufacturability, reliability, security, CAD for analog/mixed-signal designs and emerging technologies. He has published over 350 refereed journal/conference papers and 8 US patents. He has served in many journal editorial boards and conference committees, including various leadership roles. He is the ACM/SIGDA Award Chair.

He has received17 Best Paper Awards and 13 additional Best Paper Award nominations. He is a Fellow of IEEE and SPIE.