

Intelligent IC Design: The Convergence of AI and Semiconductor Engineering

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Keynote Speaker

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Short Biography

Sohiful Anuar Zainol Murad was born in Kedah, Malaysia, in 1975. He received the B.Eng. degree in Electronic Engineering from Saga University, Japan, in 2000, the Master of Science in Electronic Systems Design Engineering from the Malaysia Science University, Malaysia, in 2004, and a PhD in electronics from Kyushu University, Japan, in 2011. In 2000, he was with the industries of SGTi Globetronic Technology (M) Sdn. Bhd., Malaysia, as a QA engineer, and Sharp-Roxy Corporation (M) Sdn. Bhd., Malaysia, as an R&D engineer for almost 3 years. In 2003, he joined Universiti Malaysia Perlis to advance his academic career. Currently he is an associate professor in the Faculty of Electronic Engineering & Technology, Universiti Malaysia Perlis, Malaysia. In addition, he is a member of the Board of Engineers Malaysia (BEM) as a professional engineer (Ir.) and a senior member of IEEE. His research interests include analog IC design, radio frequency (RF) front-end design, electronic circuit design, VLSI design and the Internet of Things. He has over 100 publications, including journals and proceedings published in SCOPUS and 7 academic books, including contributions to book chapters.

Title

Intelligent IC Design: The Convergence of AI and Semiconductor Engineering

Abstract

The continuous scaling of semiconductor technologies and the growing complexity of Very Large-Scale Integration (VLSI) circuits present significant challenges in integrated circuit (IC) design, verification, and manufacturing. Traditional Electronic Design Automation (EDA) tools are increasingly limited in addressing these challenges efficiently. Artificial Intelligence (AI) and Machine Learning (ML) emerge as powerful enablers across the entire EDA flow, offering improved scalability, optimization, and design automation.

AI techniques—including Support Vector Machines, Neural Networks, Reinforcement Learning, and Genetic Algorithms—are being applied to logic synthesis, placement, routing, verification, and post-silicon validation. These approaches enhance power-performance-area (PPA) trade-offs, reduce time-to-market, and support more adaptive and intelligent design processes.

In manufacturing, AI supports defect detection, yield prediction, and process optimization. Notable industrial examples, such as Google's AI-assisted TPU design, demonstrate the growing practicality and impact of these methods. Despite progress, challenges remain in data quality, model interpretability, integration with traditional workflows, and computational demands. Bridging the gap between semiconductor engineering and data-driven AI approaches is essential. This keynote will explore the state-of-the-art in AI-driven IC design, highlight emerging trends and real-world applications, and discuss the opportunities and challenges in creating intelligent, scalable, and efficient hardware systems.